

# Flow

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... THE MAGAZINE WHICH INTEGRATES MATERIAL HANDLING EQUIPMENT INTO THE FLOW OF PRODUCTION

OCTOBER  
1947



CIRCULATION THIS ISSUE—21,207

✓ R 3 Oct. 1947 - Sept. 1948



**\$775.00**

F. O. B. Jackson

**Get the Facts**

Write for New  
Model D Folder

**"truck-man**  
*Reduced Cost*

**OF MATERIAL HANDLING**

**30%"**

(Operator's statement on file)

Enthusiastic owners report even more startling savings after installing Truck-Man's modern hydraulic lift and speedy power. From small tool and die shops, warehouses,

plants covering acres come stories of Truck-Man versatility, economy and dependability. Here are some of the ways it will save YOU time and money:



Users get 8 hours of continuous operation per gallon of gas.



Truck-Man turns in its own length!



9 out of 10 of all shop loads are LESS than 1 TON.

● **Truck-Man lifts and hustles with ease** skidded capacity loads—without dangerous starting and dropping shocks—with sure, fingertip control...

● **Snakes into holes from narrow aisles**—turns in its own length... Increases usable floor space...

● **Handles easily** with compact, light, simple controls—anyone can operate without fatigue...

● **Speeds briskly** on straightaways—creeps in crowded aisles and close squeezes... Two speeds forward or reverse...

● **Drives on big, dual pneumatic tired wheels** for traction and riding comfort... Heavy solids carry load with ample safety factor...

● **Stands the gaff** because it's engineered for dependability... Volume production and time-proven standard replacements mean low first cost and repairs...

● **Cuts costs of fuel, labor and maintenance**... And many owners praise the flexibility of their *three* Truck-Man units where they formerly used one heavy costly truck... It's easy to buy, economical to own, faithful in service!

Over 70 Truck-Man distributors in principal centers provide standard service.

Ask Any Operator About  
**truck-man**

1418 West Ganson,

**truck-man** INC.

Jackson, Mich.

# NOW READY! AUTOMATIC'S NEW Skylift GIANTS

**WORLD'S LARGEST TRACTORS  
Handle 10 to 30 Tons!**



## **SPECIALLY ENGINEERED TO KEEP HANDLING METHODS ABREAST OF STEEL AND HEAVY INDUSTRY OPERATIONS**

Completely new in design, these mammoth material handling giants contain features never before offered in heavy-duty fork and ram tractors.

4-wheel front drive assembly, with twin drive units, each equipped with two 36 inch diameter tires, provide as much as 80 inches of rubber on traction wheels—dual controls enable driver to operate from center position as well as both sides of tractor. Pivoted drive axles provide constant 4-wheel traction regardless of floor conditions—controlled caster type trail axle, center-pivoted, compensates for uneven surfaces.

SKYLIFT GIANTS are approximately 20% lighter in proportion to load capacity than previous heavy-duty fork and ram tractors. They are the first and only heavy-duty industrial trucks with high pressure hydraulic lift of original design which eliminates chains, sprockets and other forms of lift multiplication. Mail coupon for facts.

**Look to the Leader for All That's New!**



### **AUTOMATIC TRANSPORTATION COMPANY**

DIV. OF THE YALE & TOWNE MFG. CO.

141 West 87th Street, Dept. T-7, Chicago 20, Ill.

( ) Send details on Automatic's NEW SKYLIFT GIANT Fork and Ram Tractors.

Company Name.....

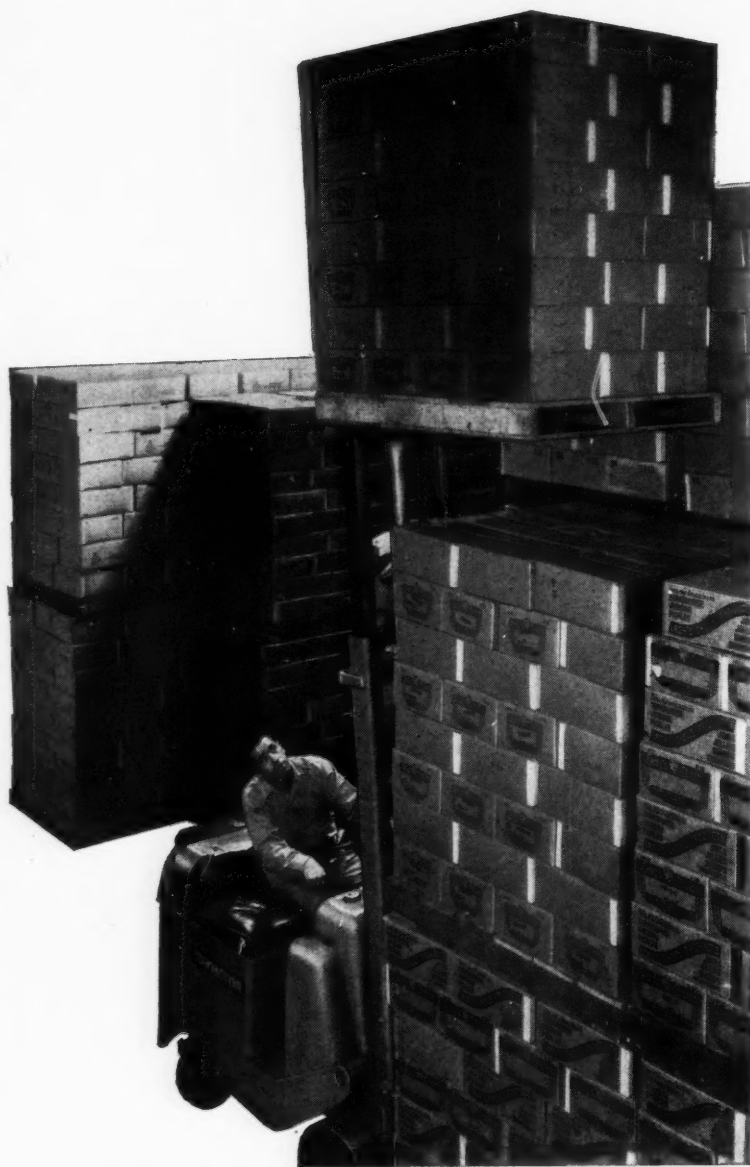
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Street Address.....

City.....Zone.....State.....

**MANUFACTURERS OF THE FAMOUS TRANSPORTERS, TRANSTACKERS, AND SKYLIFT ELECTRIC TRUCKS**  
**OCTOBER, 1947**

# FREE Warehouse Space Available



**R**ight in your present buildings there's an "extra warehouse," ready and waiting to be put to use. It's the wasted overhead storage space that Towmotor Fork Lift Trucks and Accessories can convert into useful, profitable warehouse area. Swift, safe high-stacking of commodities with Towmotor can double, or triple existing warehouse capacity without increasing the amount of floor space. To learn how Towmotor puts *all* the warehouse space to work, send for a Pocket Catalog. Towmotor Corporation, Division 8, 1226 East 152nd Street, Cleveland 10, Ohio.

SEND FOR SPECIAL BULLETINS DESCRIBING THE **TOWMOTOR** REVOLVING CARRIAGE • SIDE SHIFTER  
UNLOADER • UPENDER • SCOOP • CRANE ARM • EXTENSION  
FORKS • EXTENSION BACKREST • RAM • OVERHEAD GUARD



## TOWMOTOR

**FORK LIFT TRUCKS *and* TRACTORS**

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION



# Flow

OCTOBER, 1947

COVER PHOTO—A section of the conveyor bridge in which two belt lines carry packaged Kellogg cereals to the warehouse 2,100 feet distant. A view inside the bridge is shown in the report which begins on page 24.

## EDITORIAL DEPARTMENT

MANFRED SCHUELER,  
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HARRY W. CARPENTER,  
Technical Editor

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## PRODUCTION DEPARTMENT

WM. V. LINAS, Director

## CIRCULATION DEPARTMENT

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## FLOW EDITORIAL AND BUSINESS OFFICES—

1240 Ontario Street,  
Cleveland 13, Ohio  
Phone: Prospect 1251

## NEW YORK OFFICE—

LEE HAAS  
19-25 W. 44th Street  
Room 412  
New York 18, New York  
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# HELP

FOR YOU IN THE

## Freight Car Shortage



CUT TURNAROUND TIME  
LOAD AND UNLOAD WITH A SPEEDY

# YALE

What is needed most in the present freight car shortage is, of course, more freight cars. But new car deliveries in quantity are a long way off. In the meantime, you can get some relief by using Yale Trucks for unloading and reloading incoming freight cars.

For Yale trucks, by moving materials faster, more efficiently, cut your handling costs per ton; reduce turnaround time considerably; enable you to get more output per manhour. And that means more freight cars freed faster.

Not only can Yale Material Handling Machinery save time, money and muscle in your shipping and receiving departments, but throughout your entire plant Yale Trucks, Hoists and Scales can cut costs in every operation that calls for the handling of material. Numerous comparative tests made between manual and mechanical handling methods prove this to be so.

That's why it will pay you to get the facts on efficient material handling methods.

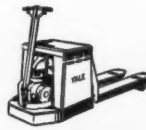
**SEND TODAY FOR FREE NEW  
70-PAGE "HOW" BOOK**

This material handling handbook, the first of its kind ever to be offered, shows you how to measure your present material handling costs and how to cut them. Send for your free copy today. Ask for the "How" book. Address: The Yale & Towne Manufacturing Co., 4556 Tacony St., Philadelphia, Pa.

# YALE

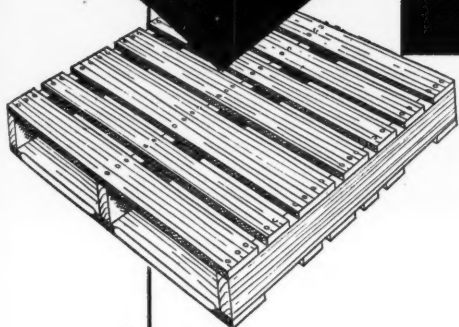
## MATERIAL HANDLING MACHINERY

CUTS PRODUCTION COSTS... SAVES TIME... SAVES EFFORT... PROMOTES SAFETY



INDUSTRIAL DIAL SCALES • HOISTS—HAND AND ELECTRIC • TRUCKS—HAND LIFT AND ELECTRIC

**REDUCE  
COSTS  
with...**



**IMPORTANT NOTICE:**  
New plants and expanded  
production facilities are  
now in full operation. Your  
inquiry or order will re-  
ceive prompt attention.



OCTOBER, 1947



## Generalift **PALLETS**

● One of the most "alive" subjects in the field of materials handling is the use of pallets. Palletized handling cuts costs. Palletized handling speeds production.

Generalift pallets and skids are tough and long lasting—made from sturdy hardwood—assembled with drive screw or ring shank nails. Stringers are flush or set in and special chamfering is available if needed.

Generalifts are manufactured in your sizes—prompt shipments. Call or write our nearest office for prices.

**ENGINEERED SHIPPING CONTAINERS**

## **GENERAL BOX COMPANY**

**GENERAL OFFICES:** 60 W. Illinois St., Chicago 10, Illinois  
**DISTRICT OFFICES AND PLANTS:** Brooklyn, Cincinnati, Detroit,  
East St. Louis, Kansas City, Louisville, Milwaukee,  
New Orleans, Sheboygan, Winchendon, Natchez.  
Continental Box Company, Inc.: Houston, Dallas.

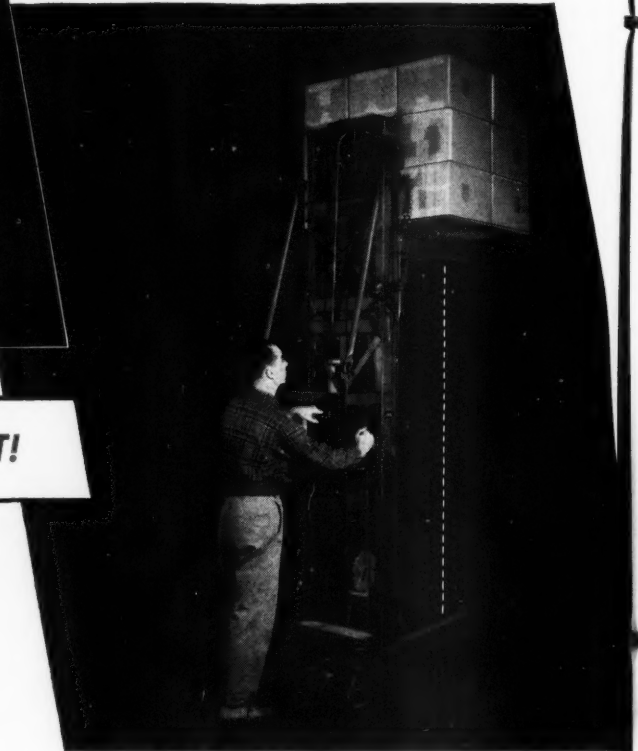
## THIS LIGHT SHOWS UP LOSSES . . .



*By means of a bulb on each man's wrist, the light follows every move he makes. It shows up the amazing waste of time and effort in stacking crates by hand.*

## THIS ONE POINTS TO THRIFT!

*One man, one motion. That's the way you save with a Barrett Portable Elevator. The crates go up, not one at a time, but in big, profitable loads!*



**W**hich is it in your plant? Are you paying for the kind of waste effort shown in this actual photographic record? If you are, it's time to save with Barrett Portable Elevators.

You'll save on floor space, too. For Barrett Portable Elevators put air space to work . . . clear the floor for productive

use. That way you save on heat, light, maintenance—some have saved the cost of a new building!

Let a Barrett engineer show you how.  
No cost or obligation.

### BARRETT-CRAVENS COMPANY

4619 S. Western Blvd. • Chicago 23, Illinois

Representatives in All Principal Cities

Canadian Licensee: S. A. Armstrong, Ltd. • Toronto, Canada



What's the best way to handle it? Write for the book with all the answers, your free copy of the Barrett Junior Catalog.

# → BARRETT

ONE MAN DOES MORE THAN 3 OR 4 . . . WITH A BARRETT

**Barrett  
Handling  
Equipment**





**Your electric  
industrial trucks  
will do more  
work when powered  
by the new**

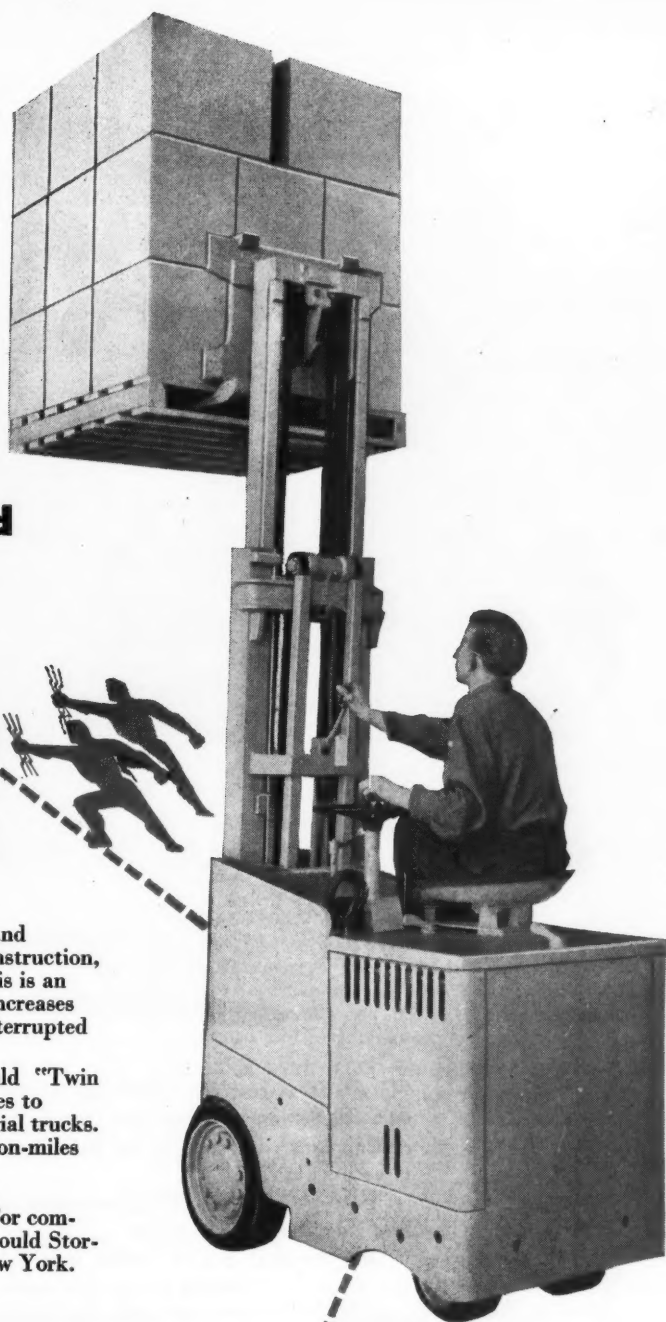
# **"TWIN POWER" GOULD BATTERY**

GOULD research, which introduced and perfected the famous Kathanode construction, has now created "Twin Power". This is an improvement in plate balance that increases power output and insures long, uninterrupted service.

In modern material handling Gould "Twin Power" Batteries add new advantages to the many inherent in electric industrial trucks. Their sustained power means more ton-miles each shift. Thoroughly protected, they are unusually free from service breakdowns: they stay on the job. For complete information get Catalog 100, Gould Storage Battery Corporation, Depew, New York.



● Gould Service Engineers will make periodic inspections of your industrial storage batteries. In the Detroit area ask for F. L. Wamsley, Gould Storage Battery Corporation, 6432 Cass Ave., Detroit 2, Michigan.



# **GOULD**



## **FOR GOULD SERVICE CALL GOULD IN THE FOLLOWING CITIES:**

Boston, Mass. • Cincinnati, Ohio • Cleveland, Ohio  
Chicago, Ill. • Denver, Colo. • Depew, N.Y. • Detroit,  
Mich. • East Point, Ga. • Kansas City, Mo. • Los  
Angeles, Cal. • New York, N.Y. • Philadelphia,  
Pa. • Pittsburgh, Pa. • St. Louis, Mo. • St. Paul,  
Minn. • San Francisco, Cal. • Trenton, N. J. •  
Washington, D. C. • West Salem, Ore. • Kingston,  
Ont., Canada. NOTE: Electric hand truck batteries are  
stocked at many of these cities.

# **BATTERIES**

OCTOBER, 1947



**"BUT THAT'S ONLY PART OF OUR SAVINGS**

**WITH *electric* INDUSTRIAL TRUCKS!"**

"Granted they cost less—much less—to maintain. That's logical when you count their moving parts . . . *none* in the battery, *one* in each motor."

"And we know, on energy cost alone, we save more than sixty per cent."

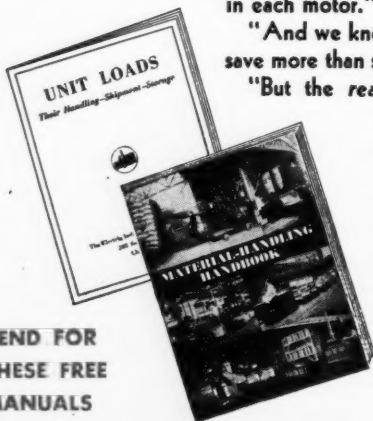
"But the *real* pay-off comes from their staying on the job, putting material where it's wanted, when it's wanted . . . without added investment in standby equipment. Minutes saved by men and machines on the production line are the *big* savings that help profits."

That, in a nutshell, typifies the conviction of experienced owners who have found, to their profit, that battery-powered trucks show a unique ability to "stay on the job."

Down time for inspection, maintenance or repair is negligible—so much so that standby truck equipment is unnecessary in many plants.

Is the economy of dependable material-handling, plus lowest operating cost, what *you* want from industrial trucks—rather than economy in first cost alone?

We believe that it is, for it affects ultimate profits of most business concerns more directly—and more heavily—than does a lower original investment.

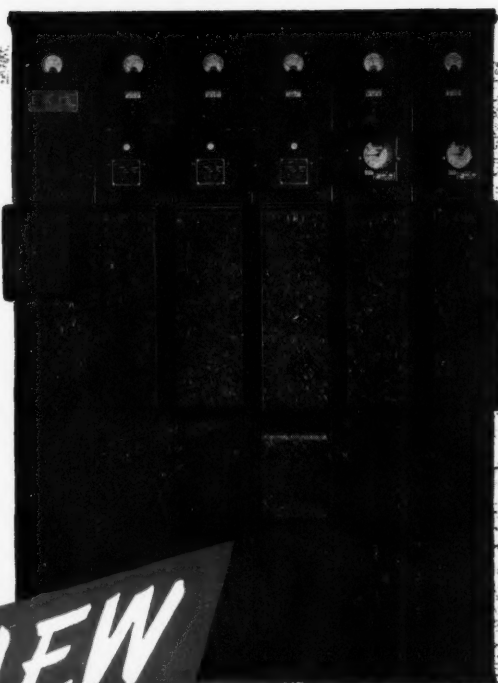


**SEND FOR  
THESE FREE  
MANUALS**

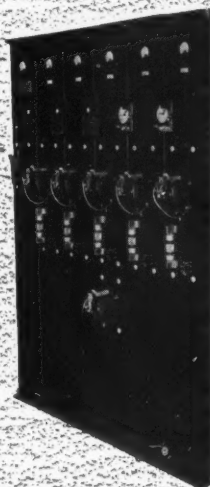
The MATERIAL-HANDLING HANDBOOK and UNIT LOADS have helped many organizations to plan material-handling savings that go straight to profits. Your letter will bring them, without charge.

**THE ELECTRIC INDUSTRIAL  
TRUCK ASSOCIATION**

29-28L Forty-first Avenue, Queens Plaza, Long Island City 1, N. Y.



Illustrated from left to right, both with and without protective control covers are: Generator Control Section; Lead-Acid Battery Circuit; Lead-Acid Battery Circuit with Selector Switch; Two-Rate Charging Circuit; Edison Battery Circuit with Selector Switch; and Edison Battery Circuit.



**NEW**

**EP**

## Sectionalized CONTROL PANELS for BATTERY CHARGING

- 1—**EASY TO INSTALL** . . . Shipped completely assembled, this lightweight panel is simply stood on its intended location and fastened to the nearest wall by two angle-iron brackets.
- 2—**EASY TO ADD MORE CIRCUITS** . . . Since each section comprises a complete charging circuit, it is only necessary to secure a few frame bolts; extend the main power bus with a jumper; and lengthen the control wires.
- 3—**STANDARDIZED CONSTRUCTION** . . . Illustrated above are the standard generator control section and the five standardized circuit sections that meet all battery-charging requirements, lead-acid or Edison. The panel height of 76" conforms to the standard height of industrial switchboards.
- 4—**OCCUPIES LITTLE FLOOR SPACE** . . . Each section measures only 9" wide. Allowing a 24" clearance from the supporting wall to permit back-of-board inspection, a five-circuit panel occupies only 9 square feet.
- 5—**TOTALLY ENCLOSED CONTROLS** . . . All controls are mounted on the front of the board within protecting covers. Dust, dirt and other harmful elements are barred. Covers are easily removed (fastened with only one screw) to permit routine inspection and maintenance.
- 6—**PROVIDES VISUAL CONTROL OF CHARGING** . . . When indicating lamp at top of board lights, it indicates that the circuit needs attention; either placing a battery on charge or removing the completely recharged battery.
- 7—**UNIFORM APPEARANCE** . . . Matches the present-day trend toward improved industrial-product design.

*This new sectionalized panel simplifies negotiation, ordering and manufacturing. It permits complete standardization. Special engineering is eliminated. The Buyer gets a better product within a shorter time.*

Ask for Bulletin 203

**EP**

X-31

**THE ELECTRIC PRODUCTS COMPANY**

1730 CLARKSTONE ROAD

CLEVELAND 12, OHIO

OCTOBER, 1947

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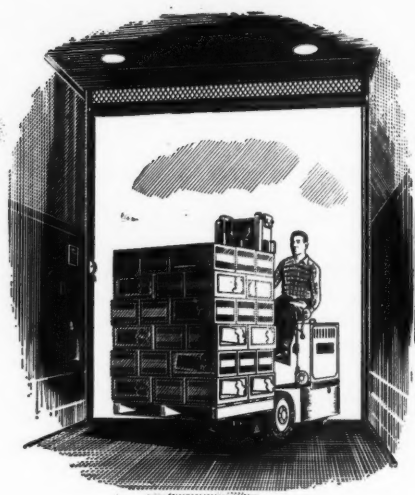
Give your industrial trucks the

# ***run-of-your- building***

**WITH AN OTIS POW-R-TRUCK ELEVATOR**

---

***An Otis Pow-R-Truck Elevator  
multiplies the usefulness of  
your industrial trucks by the  
number of floors in your building!***



With an Otis Pow-R-Truck Elevator, loaded trucks are free to travel to any floor in your plant. This means no time wasted in re-handling of loads and better utilization of manpower.

Extra-rugged Pow-R-Truck Elevators are the world's only standardized line of elevators built specifically to provide safe vertical transportation for heavy fork and lift trucks . . . the only line specially reinforced to withstand the severe impact and off-balance stresses caused by industrial truck loading. They are available in the size, speed and capacity best suited to your needs.

If you'd like to know more about these Pow-R-Truck Elevators that add the "third dimension" to your materials-handling system, write for Bulletin 664 to Otis Elevator Company, 260 Eleventh Ave., New York 1, N. Y.



**ELEVATOR  
COMPANY**

***Offices in all principal cities***



# MOBILIFT'S Formula for Faster Handling!



A MOBILIFT will handle a greater volume of packaged goods per day than any other lift truck, regardless of size. Extensive studies and countless field tests have proven this fact. The reason is simple. Because of its compact size, its shorter turning radius and the fact that it requires no gear shifting—MOBILIFT is the most maneuverable lift truck in the field. It makes more trips per day; loads from car and truck floors; eliminates rehandling and wasted effort.

Prove to yourself that these facts are true—write today for our new folder *"Mobilift's Formula for Faster Handling"*.

- ✓ Lighter Weight
- ✓ Smaller Size
- ✓ Shorter Turning Radius
- ✓ No Gear Shifting
- ✓ Greater Maneuverability



*Here's  
Proof*

## OF THESE FACTS

Send for your copy today!

### MOBILIFT CORPORATION

835 S.E. Main St. PORTLAND 14, ORE.

Please send me a copy of "Mobilift's Formula for Faster Handling".

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_

# MOBILIFT

## MOVES MATERIALS LIKE A GIANT!

MOBILIFT CORPORATION, 835 S.E. MAIN STREET, PORTLAND 14, OREGON

# \$1500



## IN *Cash* PRIZES!

FOR THE BEST PAPER ON COST REDUCTION THROUGH  
THE USE OF MATERIAL HANDLING EQUIPMENT

### in the *Flow* CONTEST

#### WHAT MAY BE ENTERED

Manuscripts may describe the cost factors entering into any type of material handling installation for either an entire plant or a single department.

#### WHO MAY MAKE ENTRIES

This competition is open to an employee or engineer of any company EXCEPT manufacturers or distributors of material handling equipment. Members of the FLOW staff cannot compete.

● Papers submitted (they may be of any length) will be judged on (1) the analysis of the cost factors entering into the installation described, with details of the methods used in measuring cost savings. (2) the evaluation of the efficiency of present methods over past methods, and (3) the technical accuracy and completeness of the entry. Pictures, charts and layout drawings are necessary to the cost analysis presentation.

RECEIVING ● PROCESSING ● FABRICATION  
PACKAGING ● ASSEMBLY ● STOCK KEEPING

Where the entrant requests it, we will keep published manuscripts anonymous as to author or company.

### AWARDS

First Prize .....	\$500.00
Second Prize .....	\$300.00
Third Prize .....	\$200.00
Fourth, Fifth, Sixth, Seventh and Eighth Prizes .....	\$100.00 EACH

IN EVENT OF TIES, DUPLICATE AWARDS WILL BE MADE

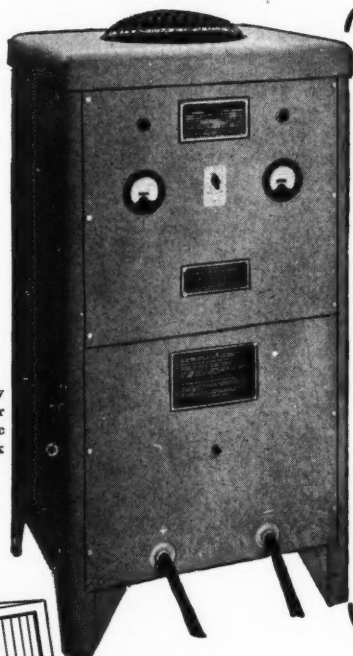
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December  
15th, 1947

SEND FOR YOUR ENTRY BLANK

Write  
CONTEST EDITOR  
*Flow* MAGAZINE  
1248 ONTARIO STREET  
CLEVELAND 13, OHIO

# No Hydrometers to Read with MALLORY Rectotruck CHARGERS

(TRADE MARK)



There are six Mallory Charger models for charging any electric industrial truck battery.



Economical handling of materials depends on economical operation of your electric lift trucks. Long trips to the battery charger and time lost in charging batteries cause lost man hours! Mallory Rectotruck Chargers are compact in size, light in weight and easily transportable. They can be moved along with your trucking activities. Give your batteries a noon-hour boost—batteries need not be removed from the truck to charge. Each Mallory Charger is adjustable for either of two power line voltages.

Mallory Chargers have been designed in collaboration with the leading storage battery and truck manufacturers to provide:

Fully automatic operation • Optimum charging characteristics • Maximum battery life • Completely trouble-free operation • Maximum service-free life • Minimum maintenance—ventilating fan is the only rotating part.

The Only Chargers with the  
Unbeatable Combination of

**MALLORY and Exide**

Magnesium Copper  
Sulfide Rectifier

TVR Voltage Relay  
(Reg. U. S. Pat. Off.)

Most rugged, dependable rectifier for low-voltage, high-current applications.

Unaffected by high temperature operation under adverse atmospheric conditions.

Phenomenal ability to withstand abuse and accidental short circuits. Self healing.

Stable, consistent charging without adjustment over long life.

Minimum maintenance—no brushes, bulbs, sparking contacts.

Precision temperature-compensated voltage relay.

Exclusive, patented inverse temperature compensating feature.

Operates during rapid rise in charging voltage characteristic of a lead battery.

Reduces high initial charging rate to low safe finishing rate.

Starts synchronous timer which controls length of time at finishing rate.

Approved by leading lead battery manufacturers.

Mallory Rectotruck Chargers are designed to charge both lead and Edison batteries to full capacity in minimum time. They are extremely simple to operate. No hydrometers to read, no ampere hour meters to set. Merely plug in the battery . . . the charger does the rest. Worries over excessive charge damage to the batteries can be forgotten—the Exide TVR voltage relay is the magic eye that watches the charging curve and reduces high initial charge to a safe finish charge, with complete dependability.

For efficient service and low maintenance cost, specify Mallory Rectotruck Chargers. Details and catalog data available through:

Automatic Transportation Co.  
Baker Industrial Truck Div.  
Barrett-Cravens Co.  
Clark Tractor Div.  
Crescent Truck Co.  
Elwell-Parker Electric Co.  
Lewis-Shepard Products, Inc.

Lift Trucks, Inc.  
The Mercury Mfg. Co.  
The Moto Truc Co.  
Wright-Hibbard Industrial  
Electric Truck Co., Inc.  
The Yale & Towne Mfg. Co.  
Philadelphia Division

Rectifier Charger Pioneers Since 1927

P. R. MALLORY & CO. Inc.  
**MALLORY RECTIFIERS**

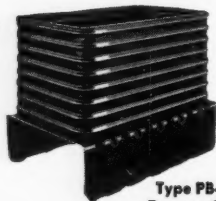
MAGNESIUM COPPER SULFIDE RECTIFIERS—RECTOPLATORS\*—  
RECTOTRUCK CHARGERS—AVIATION RECTOSTARTERS\*—  
RECTOPOWER\* SUPPLIES—AUTOMATIC BATTERY CHARGERS

\*Reg. U. S. Pat. Off.

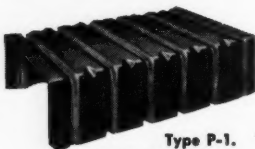
P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA



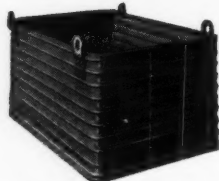
## TRUSCON STEEL BOXES AND STEEL SKIDS



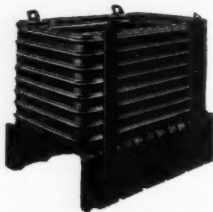
Type PB-120  
Truscon Steel  
Box and Platform.



Type P-1.  
Truscon One Piece  
Steel Skid Platform.



Type B-80C Truscon Box  
Equipped for Crane Handling.



Type PB-120L Truscon  
Box and Platform with  
full length lifting lugs.

Do your materials handling methods resemble those of a circus juggling act? Does your procedure involve a lot of baskets, nondescript boxes, loose heaps of parts and finished products, handled by a lot of grunting, struggling, time-wasting employees?

If so, you need the clean, swift-moving system of Truscon Steel Boxes and Skids. Efficient movement and delivery of material to production lines . . . efficient storage of materials and parts . . . more man hours gained and more jobs completed . . . these are worthwhile benefits assured by Truscon Steel Boxes and Steel Skids.

There is an experienced Truscon man near you to help plan a better, faster flow in modern materials handling for you. You need the economy and efficiency which Truscon methods can help you secure, to meet the demands of the competitive period that lies ahead. Write for descriptive catalog on Truscon Steel Boxes and Steel Skids.

Send for this Booklet



**TRUSCON STEEL COMPANY • Pressed Steel Division**  
**6202 TRUSCON AVENUE • • CLEVELAND 4, OHIO**  
 SUBSIDIARY OF REPUBLIC STEEL CORPORATION



# Barber-Greene



## EASY TO CHOOSE . . . EASIER TO USE! BELT CONVEYORS!



Barber-Greene "pre-engineering" simplifies your selection of the right, most economical belt conveyor set-up for your jobs. Standardized units—carriers, frames, take-ups, drives—are factory aligned, interchangeable. You can easily choose the units you need to make up a complete conveyor that's especially fitted to your material-moving problem. And, when they're delivered on the job, you'll find them plainly marked for quick installation with a minimum of "blueprint" work or on-the-spot fabrication. To gain these two big advantages—that have saved money for hundreds of Barber-Greene users—see your Barber-Greene distributor.



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*Constant Flow Equipment*



BUCKET LOADERS



BELT CONVEYORS



PORTABLE BELT AND FLIGHT CONVEYORS



CAR UNLOADERS



SNOW LOADERS



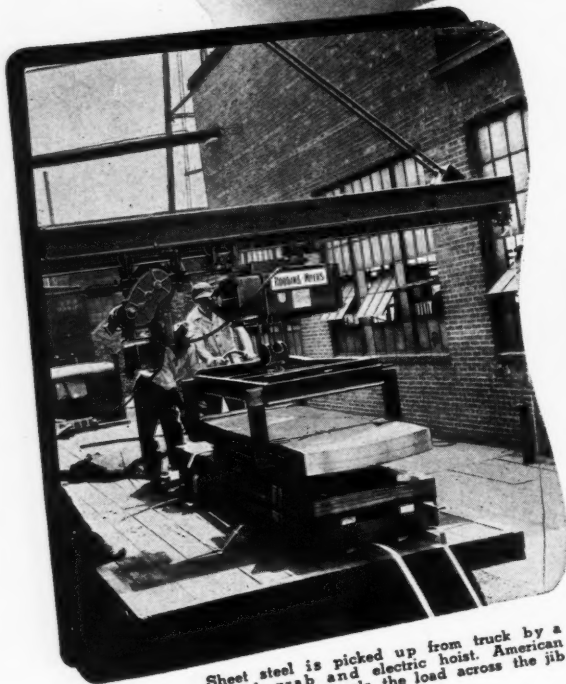
COAL LOADERS

OCTOBER, 1947

15

# Steel goes

## UP and OVER



Sheet steel is picked up from truck by a special grab and electric hoist. American MonoTractor propels the load across the job and into warehouse.



2-ton bundles of steel move easily over the stacks by push button control of power operated carrier traveling on American Rail-Master Track.

Hundreds of plants are eliminating much of their floor congestion by installing American MonoRail "Up and Over"\* Handling Systems.

In these particular plants steel goes up from truck, is transported overhead, and stacked in high piles for subsequent fabrication. Increased production at lower costs has resulted.

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Let an American MonoRail engineer show you how an overhead system will increase your production and pay for itself in a very short time.



"Up and Over" is the title of our 16 MM, sound, twenty minute movie..gladly loaned upon request.



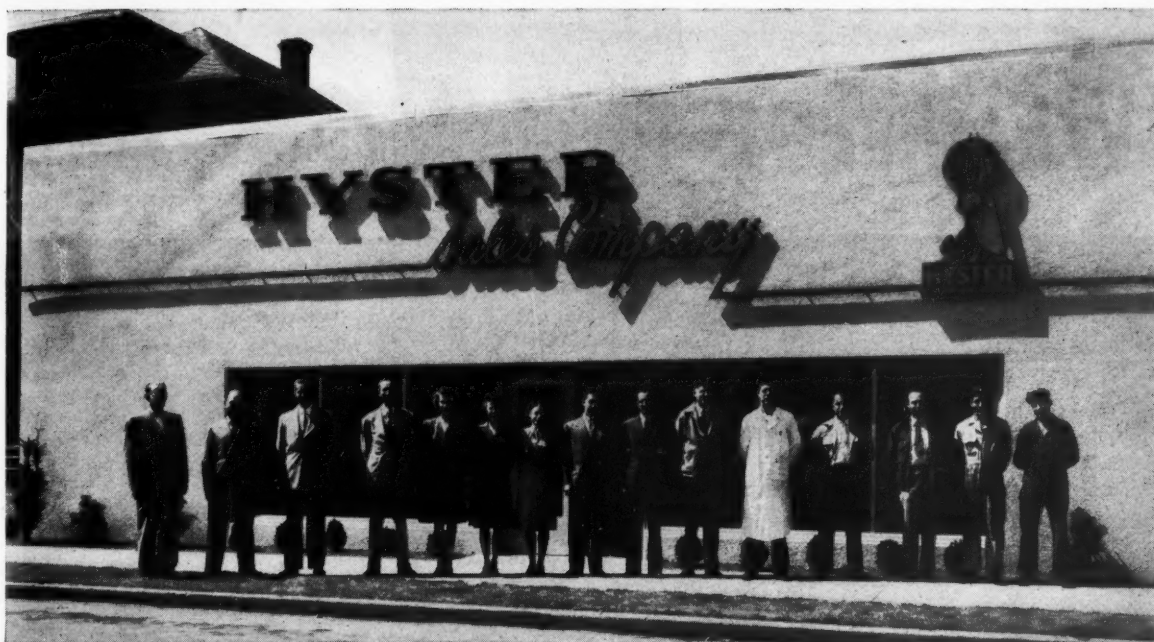
THE AMERICAN

# MONORAIL

COMPANY

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CLEVELAND 7, OHIO



Hyster Sales Company staff (l. to r.): John W. Givens, Manager; Orlin Page, Salesman; Bill Kilkenny, Salesman; Gene Pogue, Office Manager; Paula Bentrup, Office; Lurah Slocum, Office; Marguerite Prange, Office;

Joe Benway, Office; Charley Chastain, Service and Parts Manager; Ken Adams, Parts; Lloyd Anson, Shipping; Laird Lombard, Service; Rolland Dorsey, Service; Mel Noland, Repair; Leon Yandell, Repair.

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J. W. Givens, manager of Hyster Sales Company and veteran of 18 years with Hyster Company.

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Hyster "40" Lift Truck . . . .	4,000
Hyster "75" Lift Truck . . . .	7,500

Hyster "150" Lift Truck . . . .	15,000
Hyster Karry Crane . . . . .	10,000
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Hundreds of Hysters are at work in Pacific Northwest industries—saving time and money for their owners. One or more of these models will fit your needs, too.

Hyster Sales Company is completely staffed, with experienced sales engineers and service men. *We can engineer a complete material handling operation.* Phone, wire or write for information.

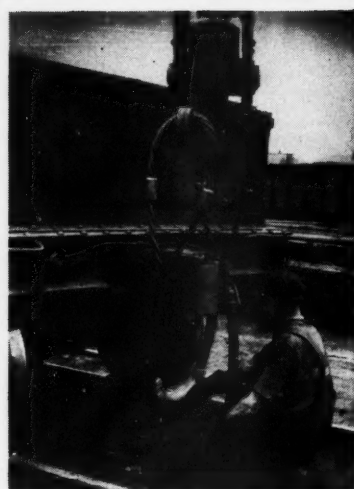
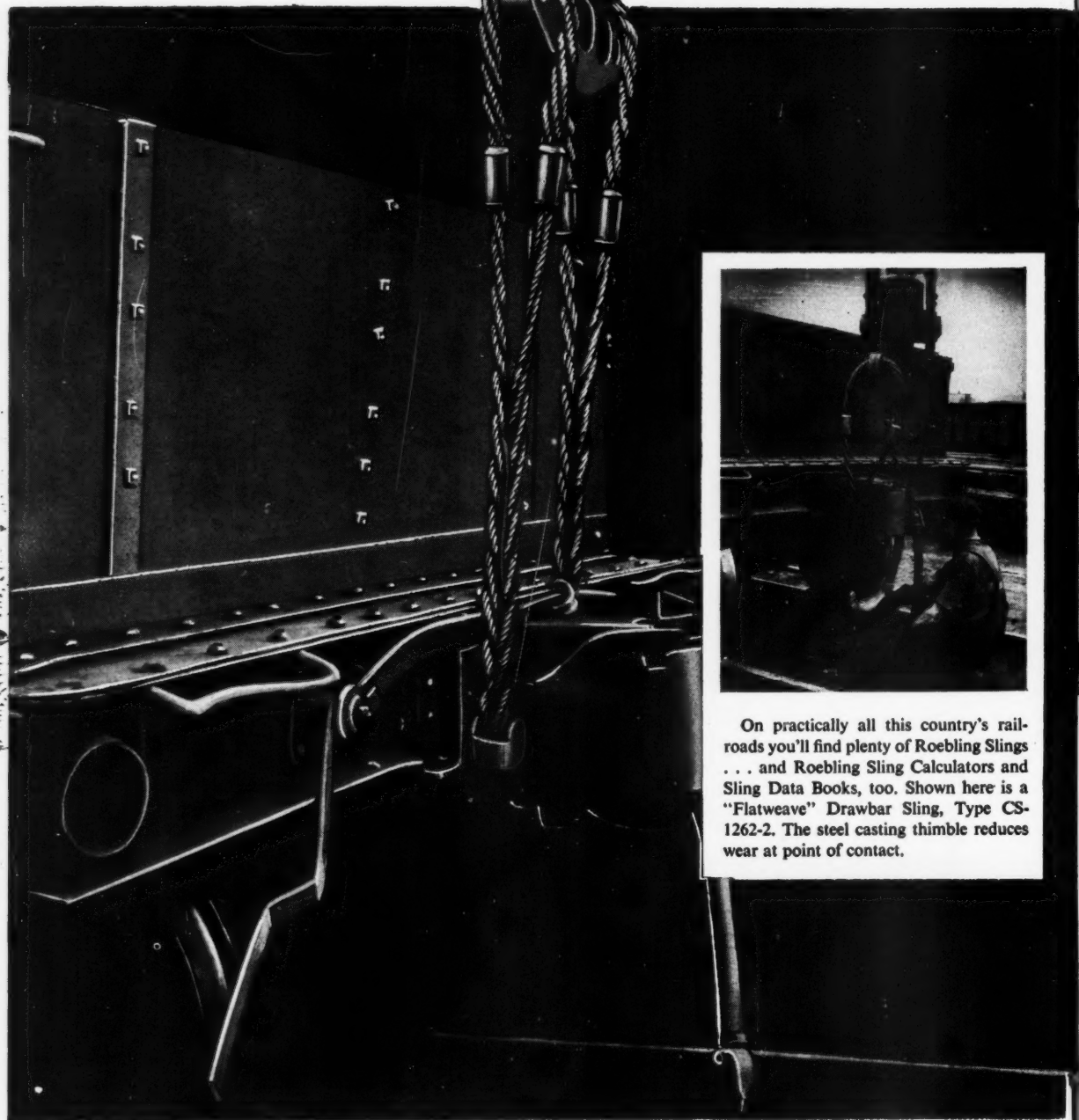


## HYSTER SALES COMPANY

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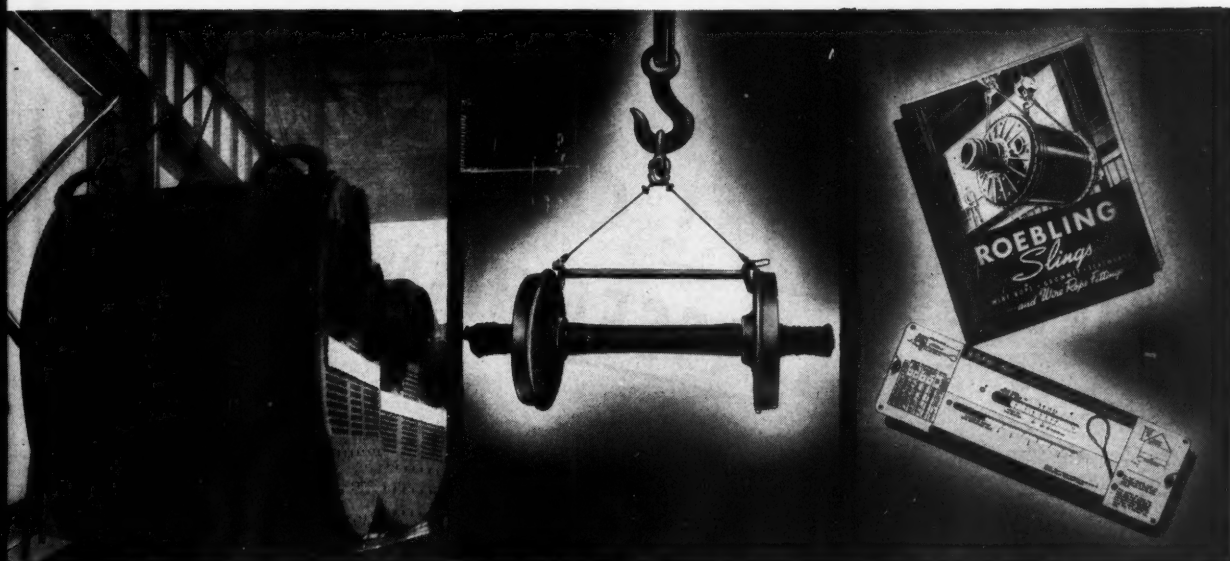


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OFFERS YOU THE ANSWERS TO YOUR  
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Bulky marine gear is easily handled when you team up Roebling Slings with the Sling Calculator and Sling Data Book. Here a ship boiler weighing 53 tons is lifted with a Roebling 1 1/4" diameter type CS-169-1 equalizing bridle sling.

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Here is a combination that can't be beaten. The Roebling Sling Calculator is a simple-to-use slide rule that tells at a glance the correct sling size for every weight and class of load. The Roebling Sling Data Book gives complete details on sling design, construction and use.

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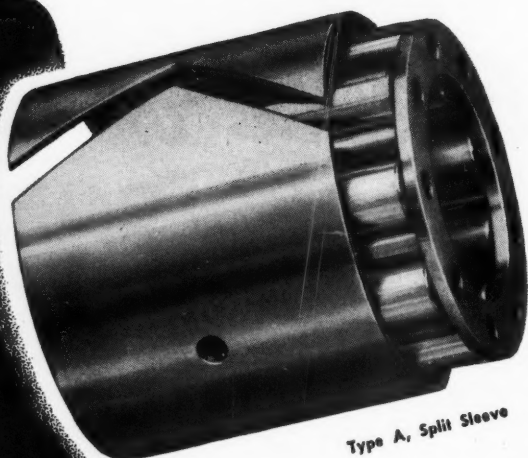
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*Steel-Cage-Type*  
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Type A, Split Sleeve

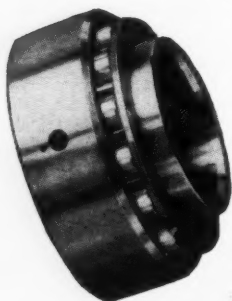
**CUTS INITIAL COSTS...**  
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Certain types of Rollway's Split Sleeve Bearings (Inch Series) are priced so low that they cost no more than ordinary plain bearings. Rollway developed these bearings to meet the low-cost requirements of your equipment. And they do the job they're meant for.

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With the Type D Metric Series, press the inner race on the shaft during bench assembly and place the roller assembly and outer race in the housing, *right on the assembly floor.*

*Rollway Steel-Cage-Type Roller Bearings make your equipment easier to build, easier to sell, easier to maintain.* They help your equipment to greater efficiency despite heavy loads, high speeds and longer hours of continuous operation.



Type D, Metric Series

**CUT YOUR BEARING COSTS**

Let our field engineer recommend the specific type of Rollway Steel-Cage-Type Roller Bearing for your particular needs. Or send us a print or detailed statement of load, speed and operating conditions for **FREE** analysis and recommendation. No charge or obligation . . . and we keep your information confidential.

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# UNION METAL

*Engineered*

## Materials Handling Equipment

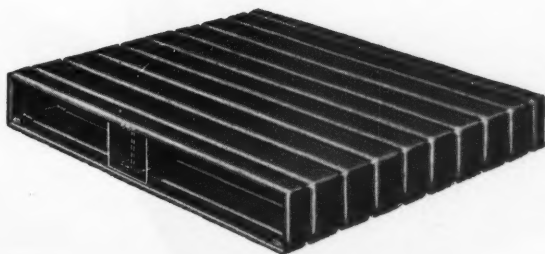
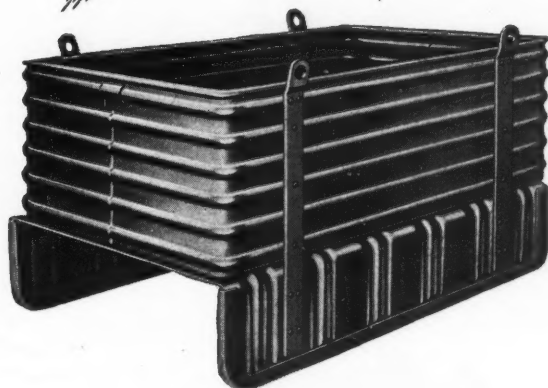


### BOXES • PALLETS • SKID PLATFORMS

**H**ERE are 5 important advantages—and there are more—that these *steel* units give you:

- (1) Cut handling cost.
- (2) Move materials quicker, safely.
- (3) Keep floor space clear for production needs.
- (4) Effectively use every cubic foot of storage area.
- (5) Implement production line efficiency.

Plant operators throughout the country have made these gains with Union Metal's steel boxes, pallets, and skid platforms. These rugged, long-lasting units are designed and *engineered* to do the jobs intended. They're produced by Union Metal... specialists in steel fabrication for over 40 years. Our engineers will gladly analyze your requirements—help you plan money-saving solutions. For complete information, write The Union Metal Manufacturing Co., Canton 5, Ohio.



**UNION METAL**  
*Materials Handling Equipment*

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YALE-2000 lb.  
Center-Control  
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"WORKSAVER"  
Tilting Fork Truck  
Capacity up to  
2000 lbs. Electric  
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## *Eventful Past...* **PROMISING FUTURE**

**B**EGINNING with this issue, FLOW Magazine is starting its third year of publication. A lifetime of experience seems to have been compacted into the short years of FLOW's history. They've been exciting years because they justified our faith in the material handling industry. And, as we look ahead, the prospects are just as eventful and promising.

In an astonishingly short time, FLOW found whole-hearted acceptance on the part of all industry. Officials and engineers alike recognized the vital part of efficient material handling methods in the postwar era. A company that wants to hold its competitive edge **MUST** have up-to-date, low-cost material flow and handling methods.

The postwar era has been characterized by plant expansions, due to increased production schedules, and higher costs. But more space by itself was no cure-all, management and engineers discovered. The application of modern flow engineering principles had to be considered an integral element in the revamping projects. The same was of course true of new structures, which were designed for efficient handling. If FLOW in these few years has made U. S. industrial management more keenly aware of the importance of modern handling, it already has made a real contribution to greater industrial efficiency.

FLOW was again justified in its all-out support of the first National Material Handling Exposition, held in Cleveland last January. The whole material handling industry came into its own with this show. It was pronounced a complete success by visitors and exhibitors alike.

The first Exposition, successful as it was, is now considered only a modest beginning. Here's why. Already by May of this year, three times as much space has been sold for the second show (next January) as was used during the entire first Exposition. We feel privileged to have had more than a small part in supporting and promoting the Annual Material Handling Exposition.

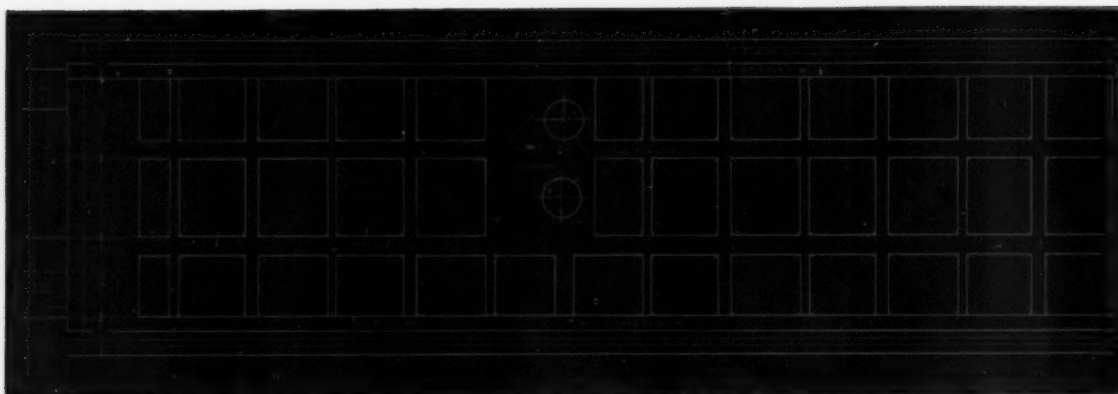
We take another glance ahead—this time to a FLOW project—the Material Handling Directory. Between the covers of this 400-page volume, all those interested in lower costs will have available, for the first time, a complete guide to all types of equipment. A wealth of engineering and application data will enable engineers to analyze their needs and make the most suitable choice for their requirements. The **DIRECTORY** will be available later this year.

We appreciate that FLOW's growth is due to the support of its thousands of readers who represent a progressive segment of U. S. industry. The support of this alert group in turn puts an obligation on FLOW to maintain its constant search for ideas on the most efficient and economical operations in all fields. This is and remains our No. One responsibility.

Yes, a lot has happened during FLOW's short life. We continue to feel young. In recent months we expanded our staff, and we are raising our sights to new projects that are in the offing. We'll tell you about them in later issues.

To the thousands of FLOW readers, a sincere "THANK YOU."

*The Editors*



THE PLAN: Kellogg Company has similar projects on way elsewhere. Note central location of tables.

**BELT CONVEYORS  
PALLET • FORK TRUCKS**

*Some of the features involved in the Kellogg Company's new central warehousing operation: 1. A 2100-foot conveyORIZED "highway." 2. Conical revolving tables for case sorting. 3. A fleet of 16 fork trucks for all warehousing and car-loading of a record-breaking volume of ready-to-eat cereal products. Savings accrue not only in handling but in traffic and warehousing operations as well.*

## Tying a WAREHOUSE To a Plant a HALF

THE trend toward the segregation of warehousing and shipping from manufacturing is impressively exemplified through recent installations at the Kellogg Company, Battle Creek, world's largest manufacturer of ready-to-eat cereals. The project involved

the construction of a 235' x 800' warehouse and a 2,100-foot-long conveyor system. The conveyors connect the manufacturing plant with the new warehouse. In the latter, the pallet-fork-truck method is used for all cased goods.

The new facilities for the storage

and shipping of all ready-to-eat cereals in packages were constructed within the past year. This tremendous new project was designed to eliminate the former storage in three different locations in the multi-story manufacturing buildings and the physical effort in-

WHERE IT STARTS: Warehouse conveyors in assembly room receiving cartons from production lines.



CONVEYORIZED HIGHWAY: Straightaway of 2100-foot lines (in bridge) delivering to the warehouse.



volved in manual piling. Prior to the construction of the central warehouse, cases from production and packaging lines were placed on carriers for movement to one of the several storage zones, where the containers were piled individually by hand. The slow case-by-case procedure was again performed when the goods were needed for shipping. The old shipping dock was located along two tracks between two manufacturing buildings. Another loading platform, an open one, could not be used in inclement weather. Lack of shipping capacity was a big drawback. The old dock had a capacity for 16 cars, and the greatly increased demand for Kellogg products during recent years necessitated more shipping facilities.

To overcome these handicaps, the 235' x 800' one-story warehouse (with an 18' clearance) was constructed some 2,100 feet to the east (rear) of the manufacturing build-



WHERE IT ENDS. Products are discharged on conical revolving table for sorting.

## F MILE AWAY . . .

ings, which are located on the west (front) portion of the company's 94-acre property. This site for the new warehouse was chosen because of accessibility to two railroad tracks and because the front of the property was needed for future manufacturing building projects. As indicated, the 2,100-foot distance between manufacturing and warehousing is bridged by a belt conveyor system, which consists of two parallel 20" canvas belt lines running in a bridge that is 10 feet square. A section of this bridge is shown in the cover photo.

### Special Methods Engineered

Each line consists of seven flights of 6-ply, 37-ounce impregnated canvas belting, with adjoining flights connected at right-angle turns by chain-driven roller curves.

In view of the tens of thousands of cases of all types of packaged cereals coming off the production lines daily, special provisions had to be engineered to route all cases from the automatic packaging ma-

chines to a central collection area.

This was accomplished with the installation of the conveyor assembly room, located on the second floor of No. 2 Building, a place located centrally to all manufacturing facilities. Existing conveyors had to be extended to route the cases into this central collection area, which is entered by five belts from the various manufacturing floors. (Previously, the cases were taken off at four different locations for movement to storage.) The five belts feed to the two main belt lines that deliver to the warehouse.

Here are further details of the methods developed to insure smooth functioning of the 2,100-foot-long conveyor system that starts in the assembly room. To deliver perfect cases at the receiving point in the warehouse, a conveyor checker was stationed in the assembly room. This worker has a full-time job to see that the arriving cases are properly sealed, properly dated, and that the print is not smeared. When faulty cases are found, the operator shunts them

over a return line to the reclaim department for repairs. Thus only perfect cases reach the warehouse, eliminating the problem of setting aside and returning damaged or improperly sealed cases.

The operator in the central conveyor assembly room is also responsible for the production count, which is done by photo-electric cell counters at points where the lines

ONE OF THREE FORK TRUCKS. They do all warehousing.





enter the room. These counters are checked by two master counters installed on the two main warehouse conveyors at the entrance to the bridge. Thus a total count is obtained and an extra check is made. In the warehouse, each truck operator marks his pallet loads on a regular load tally, and these figures are then checked against the manufacturing totals.

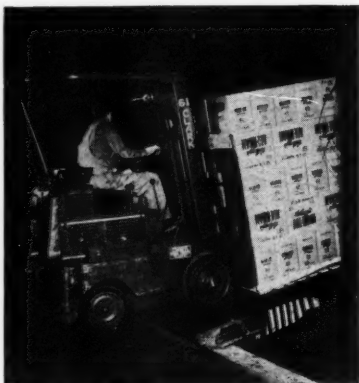
It was previously mentioned that five belt conveyors deliver the cases from the several manufacturing floors to the two warehouse lines. To prevent clog-ups at the points where two lines meet, bar timers are used to feed the cases to the main lines traveling longitudinally through the room. In this manner any jams are avoided that would result if the flow from the lateral lines to the two longitudinal conveyors were not subject to "traffic control."

It is likewise important that the cases, starting out on their trip of almost half a mile, be properly centered on the belts. This is accomplished by means of centering devices, one near the start of each belt. This consists of motor-driven belt guides linked together in such a way that all cases entering the line are centered, regardless of how wide or narrow they are. (The centering device on the right-hand line was out of service when the photo was taken in the conveyor assembly room.)

### Conveyorized Highway

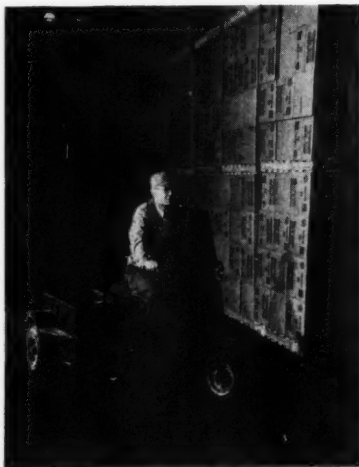
With the cases thus properly counted and centered, they are ready to start their long trip. In the assembly room, the two main lines incline to two overhead belts, which extend from the room at right angles and are connected by two curved sections of roller conveyor driven by chains. The conveyor then makes another 90-degree turn to enter a 260-foot-long bridge constructed along the building. Following this, an 80-foot section of bridge carries clear of the building. Each 2,100-foot main line consists of seven separate and connected belts, the longest section on the straightaway measuring 1,400 lineal feet. The bridge length is 1,700 feet, with the remaining length of the conveyors being made up by the sections traveling in the buildings at either end.

It is an impressive sight to see the thousands of cases—of all sizes and types of cereal products—traveling neatly centered on the



**STURDY, SAFE BRIDGE RAMP.** It has guard rails and adjustable pins. Eleven trucks load all the cars.

lines to the distant receiving point. The impression one gets, especially on the straightaway, is that of a two-lane conveyorized highway carrying the products to the sorting tables in the warehouse. The orderliness, neatness and cleanliness of the high-volume handling



**ON MOTORIZED SCOOTER.** That's how shift foreman keeps in touch with all loading gangs in huge plant.

operation are apparent. Described below are certain operational details.

### Conical Tables, Palletization

The belt lines enter the warehouse at the southwest corner where they travel over the loading dock to the sorting tables in the center of the building. This central location, it will be realized, holds subsequent truck travel in any direction to a minimum. Each of the

two belt lines dips over a conical revolving table 30 feet in diameter. The arriving cases are discharged over a spiral friction chute (see photos) onto the conical surface. Each table makes one revolution per minute.

The cases thus slide slowly down the sloping surfaces to the outer arc, which is slightly tilted up. The small "trough" thus formed prevents the cases from sliding off. The inclined outer circumference of the table also serves another purpose. The absence of a raised edge makes it unnecessary for the operators to lift the cases off. The cartons can be slid off, which is the easiest method of removal.

The problem of engineering the optimum degree of angle on the conical tables required considerable time and experimentation. The correct slope is necessarily determined by the weight of the product handled, the type of package (whether bag or carton), and the exterior material of the container (whether jute, Kraft paper, etc.). One type of container will be more "slippery" than another, and this must be taken into consideration. Kellogg Company engineers experimented with a mockup table for five months. Angles, speeds, weights, and types of containers were thoroughly tested during this period.

As can be seen from one of the photos, pallets are spotted around each table. The distance from the revolving edge to the pallets is 2½ feet, which provides a convenient working area without waste of space. The operators stationed at each table load the 37 pallets with a minimum of walking. The sorting and palletizing operation, it can be appreciated, is greatly facilitated because the cases travel by on the revolving tables while the operators are stationary. Workers do not select certain types of products but remove the cases "as they come." And because no lifting is required, each operator can without undue effort palletize up to 500 cases per hour.

Figuring the palletizing areas, each table takes up an area that is 60 x 60 square feet, which also includes empty pallet storage. The pallet size adopted as standard is 44" x 54", which was found most suitable for the shipping containers (Turn to page 57)





ELWELL-PARKER PAPER LIFT TRUCK

# DEPENDABLE POWER



## EXIDE-IRONCLAD POWER AND BATTERY ELECTRIC TRUCKS

**They're saving time and cutting costs  
on materials handling jobs like yours**

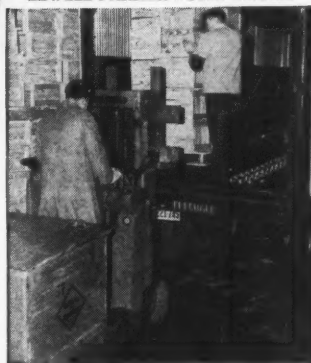
More and more companies, with operating conditions that closely parallel yours, have discovered the way to faster, safer and more economical handling of materials. They have given the job of lifting, hauling and stacking to the efficient battery electric truck and equally efficient Exide-Ironclad Batteries.

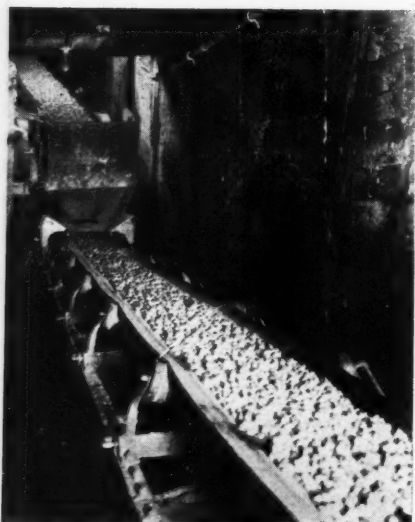
The high electrical efficiency of Exide-Ironclad Batteries is due largely to the unique construction of the positive plates. Each of these plates consists of a series of slotted, hollow tubes which contain the active material. So fine are these slots that, while they permit easy access of the electrolyte, they prevent the active material from readily washing out. Not only does this add to life of plates . . . and battery . . . it also provides higher power ability and capacity, assuring dependable, day long performance with maximum safety and minimum maintenance.

Write us for a **FREE** copy of Exide-Ironclad Topics, which contains "Case Studies" of materials handling problems. It tells how to cut handling costs up to 50% . . . covers latest developments in handling materials from receiving to shipping.

THE ELECTRIC STORAGE BATTERY COMPANY  
Philadelphia 32  
Exide Batteries of Canada, Limited, Toronto

ELWELL-PARKER FORK TRUCK





**MATERIAL RECEIVING HOPPER:** Aggregates pass from storage belt to troughed belt.

# One-Man Control..

## for ready-mixed concrete

**TROUGHED BELT CONVEYORS,  
SCREW CONVEYOR, BUCKET ELEVATOR**

*Capacity production of 100 cubic yards an hour with one operator. A conveyor system feeds all aggregate materials from storage bins 28 feet below ground level to a 70-foot high loading tower. All handling is by electric controls.*

**W**ITHIN recent months the newly organized South Euclid Concrete Company, South Euclid, Ohio, started operations with a material handling system that was designed for one-man control. All materials are moved to the loading or storage tower by an operator who merely manipulates electric switches. The company's fleet of 10 concrete mixing trucks are similarly charged by electric controls.

Advantages of this continuous handling method were described by company spokesmen as follows: 1. Speedy unloading of hopper cars over underground storage bins. 2. Centralized control of flow makes all materials available at one loading point, eliminating truck waiting time. 3. Continuous conveyor handling of heavy tonnage with minimum of manpower. 4. Improved quality of the ready-mixed product because of exact proportioning and automatic weighing of ingredients.

### Flow by Remote Control

The underground storage bins are located some 375 feet north of the loading tower. The hopper cars are spotted on the 135-foot spur under which the bins for the various materials are located. Each of the five bins has a 25-foot-square receiving hopper, funneling the material down to a depth of 28 feet. Constructed of reinforced concrete and sunk into rock, each bin has a capacity for 250 tons of material. The bins are allocated as follows: two for sand, two for slag, and one for stone.

A 24-inch by 125-foot rubberized belt runs the full length under the discharge spouts of the bins. The spouts are of the vibratory type, actuated by solenoid switches which in turn are controlled from the loading tower. Thus the control operator in the tower can start the material flow from any of the storage bins and, by throwing another switch, deliver it to any of three bins in the loading tower,

which have a capacity of 70 tons each.

From the end of the feeder line running under the bins the aggregate materials drop through a material receiving hopper onto the delivery line. The latter inclines 18 degrees on its travel across the yard and carries the sand, slag or stone a distance of 264 feet to the top of the loading tower. Transfer to the individual bins (for slag, stone, or sand) is accomplished by means of a turntable hopper at the discharge end.

Bulk cement is received both by truck and rail car at the west end of the plant. A photo shows the layout of this hermetically sealed system, including the conveyor lines. The material from the cement car hopper drops into the housing of a screw conveyor, which delivers to the boot of the bucket elevator. (A canvas-and-metal chute connects from the hopper bottom of the car to the screw conveyor.) The bucket elevator delivers to a storage hopper at the top of the tower. When this is filled to the required level, the additional cement delivered passes through overflow pipes (also shown in the photo) to the reserve hopper indicated on the lower level. When needed, the cement is transferred from the reserve hopper via the same screw conveyor for delivery to the storage bin atop the loading

UP IT GOES: A portion of the troughed conveyor moving material to storage bins atop 70-foot tower.



### Mechanically Speaking

The feeder belt running under the storage bins is driven by a five horsepower motor, and the delivery line by a 20 horsepower motor. Both have variable speeds, and the delivery belt has a maximum speed of 350 F. P. M. It has one automatic vertical gravity uptake and three roller bearing idlers on 4'6" centers. The hourly capacity of the belt is 150 tons of materials weighing 100 pounds per cubic foot. Like any other part of the system, the turntable hopper is also electrically operated from the centralized control room in the tower.

Both the screw conveyor and the 70-foot bucket elevator are operated by a 15 horsepower motor. The buckets on the elevator are located on 15-inch centers, and the equipment can move 500 barrels of cement an hour.

tower. The storage capacity of both bins is 1,000 barrels.

Thus the flow of sand, stone, slag and cement to the overhead storage and loading system is governed by electric controls. Once the material is in the control tower, the operator knows at all times the amount in each hopper. This is accomplished by means of electric bin controls which flash a signal on the panel when the material drops below a certain level. In such a case, the operator merely throws a switch in order to refill the bins with any of the four types of material required.

### Loading Mixing Trucks

As a mixing truck pulls under the loading tower to receive a charge, all the ingredients are measured as they pass to the waiting vehicle. For water and cement, solenoid switches are synchronized with the scales and automatically close the hopper when the correct quantities have been released. The

(Turn to page 57)

TOWER LAYOUT: 1: Bucket elevator 2: Cement storage 3: Overflow spout 4: Reserve cement storage.







dling of strip steel by the bundle instead of single sheets. 3. More efficient grouping of assembly operations with maximum space economy. 4. Up to four times more output from the same (or smaller) assembly areas. 5. Gain of manufacturing space by utilization of headroom for storage of packing materials. 6. Better working conditions and housekeeping.

The Penn Electric Switch Company's Goshen plant experienced four additions since the modern building was erected in 1937, but the growing business volume had a way of keeping up with, or just ahead of, the plant enlargements. This has been typical of many firms since the end of the war.

The company makes automatic switches for several major industries. Among these are controls for oil burners and coal stokers, commercial refrigeration and air conditioning, also for water pumps and air compressors, and protective controls for individual engines.

The rectangular manufacturing space is 267' x 420', and space for offices, laboratories and service departments brings the total square

This portable belt conveyor facilitates use of mezzanine floor for storage of carton stock.

partments were relocated for a better work flow. 2. A new receiving department for sheet steel and coil stock was installed in the south-central section of the building, indicated by "Receiving and Shipping Dock" on the flow sheet. 3. Redesign of layout in individual departments in relation to general material flow, such as in assembly and plating. 4. Retention of the old receiving department for rod stock because of proximity to the machine shop. 5. Application of modern facilities for mass-handling of materials with minimum effort. 6. Conveyorizing of assembly lines.

The flow starting from both receiving areas can be conveniently followed on the accompanying flow sheet. Material for stampings travels north from the (relocated) shearing press through blanking, forming, plating, etc., into central stores. Rod stock, received at the

Packing follows at end of assembly, with prepared cartons being fed down from mezzanine.



Each panel travels with its case. Hopper and stack bins contribute to neatness of operation.



*is not the key to lower costs*

footage to 150,000. In 1944, when the company went from a job shop basis to mass-production conveyor line assembly, the plant layout was redesigned due to both the volume increase and product changes. At the time, new refrigeration controls and gas-oven controls were added.

#### Old and New Layouts

While manufacturing floor area had been added, the old (job shop) process flow proved too roundabout for efficient material flow. The management therefore ordered a complete redesign of the layout, shown in the flow sheet reproduced on these pages.

Following are the main features of the new layout, which made possible to a large extent the improvements enumerated in an earlier paragraph. 1. The machining de-

original dock, moves west to central stores, which is adjacent to the assembly areas. It can be seen that backtracking, a problem under the old layout, is nowhere in evidence.

This gives a general idea of the main flow lines. Some points of detail are important. While the packing and crating department was formerly in a central position to the assembly areas, the assembly lines traveled in a lateral direction to the plant. This resulted in some confusion and extra handling because the finished assemblies had to be transported some distance to packing.

Now, on the other hand, the conveyorized assembly lines have been located in a longitudinal direction to the plant. This makes them terminate in the area adjacent to the packing department, requiring only short hauls. From several

other available examples only one more need be given as a further illustration. In the plating department, where all handling used to be manual, the individual tanks were relocated for line flow. Again, re-handling, human effort and backtracking were avoided, with resultant operating economies and greatly improved working conditions.

#### Material Flow

A quick review of the material flow under the old layout will bring out the efficiency of the present arrangement. At that time, such raw materials as sheet steel, sheet brass, rod stock and others entered the plant at the one receiving dock on the east side, indicated by "R. R. Siding." All this material was handled and stacked manually in the east section of the plant. From here it was routed to the shearing press, which was then located in this area. The pieces were then trucked some 260 feet south for such operations as blanking, drawing and piercing. They had to be returned in a northerly direction to degreasing and the drill press department for tapping operations. From here the circuitous route continued to the enameling ovens, which were located midway between the punch press and the screw machine departments.

The following comparative figures show the striking economies effected in terms of shorter moves and reduced handling. While this comparison covers a specific piece part, it is typical of what happened to all stampings and machined parts.

Backtracking, it can be seen, increased the travel distance of work in process almost by 100 per cent as compared with the short hauls of today. Here is the result obtained on a plant-wide basis: a total saving of 190,000 ton-feet, or 34.5 ton-miles in intra-plant transportation per year. From this figure it is easy to visualize the following: 1. Better utilization of manufacturing areas, not congested by loads in transit and intermediate storage. 2. Better stock control of work in process. 3. Orderliness and better housekeeping.

#### Aspects of Physical Handling

For purposes of this article, the following three phases of the physical handling were chosen: 1. Raw

material receiving. 2. Use of headroom for carton storage and better packing practices. 3. Conveyorized assembly.

Efficient material handling methods, engineered as part of the plant-wide revamping program, are helping realize the potentialities of the new layout. A three-stall truck well is part of the new receiving department for sheet and coil stock at the south end (from where the material flows north). The handling at this point is accomplished with practically no effort since all lifting, stacking and positioning tasks are done by electric hoists running on monorails.

The lifts of steel are picked up from the trailer beds by a hoist which travels on a 25-foot track extension outside the building. While originally the weighing was done on a floor scale, a floating monorail scale has been more recently incorporated in the overhead trackage. Thus the material arrives at the stockpile without intermediate handling. A manually operated sheet-type of grab is used. The center section of the grab rail, incidentally, is notched out to allow grasping of the bundles which are packed on center bolsters.

Within the plant, a pull switch guides the traveling loads to either of two parallel storage tracks, one 60 and one 80 feet long. A spur

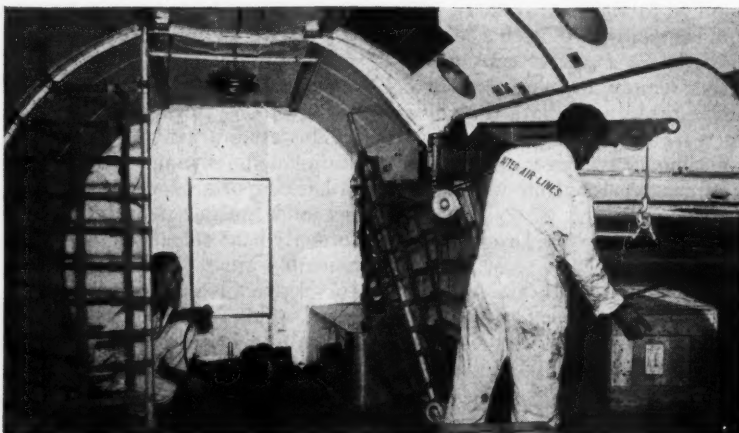
section at the end of the 60-foot track curves over and connects to the longer track via a pull switch, as shown in one of the photos. The track system also covers the shear, located in the center of the area, to which the 3,000-pound bundles are transferred. Thus the incoming bundles of steel can be placed either in the stockpiles or they can be deposited on the table at the feed end of the shearing press. If part of a bundle is not used, the remaining portion can be replaced by the hoist on the stockpile in a quick effortless operation.

An efficient device in this area, included in the "receiving" photo, is the specially designed rack for the storage of the sheared end pieces of scrap, which can be used for parts of smaller units. Thousands of these pieces are stored in the many rack sections, each marked according to the gauge and type (steel, copper or brass) of material it contains. The maximum rack height is 8'9", with a length of 25' and a width of 8'. The many different types of metal in varying gauges are thus instantly available (without time-consuming searching) in a minimum of floor area.

For coil stock, a hair pin hook is used in conjunction with one of the hoists. The coils are stacked vertically on angle iron racks just south of the shear, to one side of strip storage. The vertical position

#### WINCH ON WINGS

**T**HE electric winch shown anchored to the floor of this Cargoliner has a capacity of 2,000 pounds and is run from the ship's power system. For

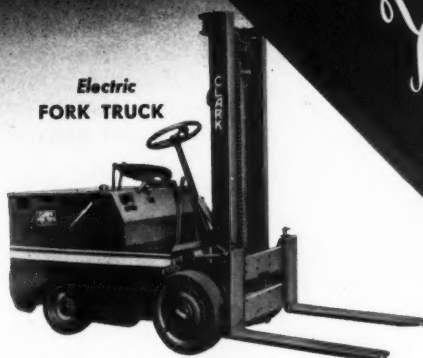


hoisting purposes, a  $\frac{3}{8}$ " aircraft cable is used in conjunction with a detachable boom which swings clear of the side of the fuselage. This winch is used in off-line operations—in places where the customary powered material handling equipment is lacking. Another use for the hoist is to drag cargo forward in the cabin.—Courtesy, United Air Lines.



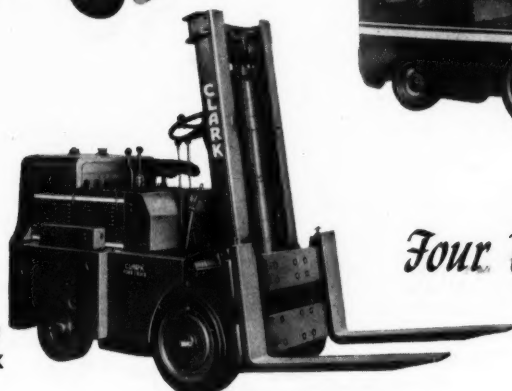
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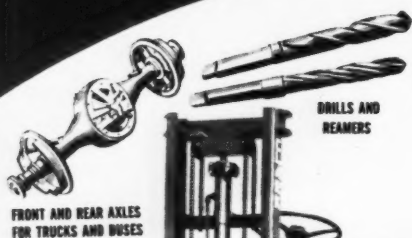
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OTHER PLANTS — BUCHANAN, JACKSON,  
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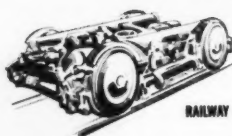
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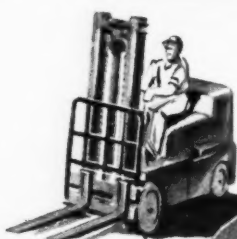
features, designed to make every Clark fork truck outstanding for versatility, quality and low cost performance, constitute a PLUS of paramount importance in material handling.

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- the RAM simplifies handling of coiled wire and steel, and many fabricated units.
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- the REVOLVING HEAD carries and dumps loads of scrap or bulk material.

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when there's a Clark fork truck to handle it.

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permits power handling of the loads in storage when they are to be moved to the nearby press department.

In the plant, the main switch that guides the loads to either of the two storage tracks, also connects to a 30-foot track that extends east to the switch over the roll feed presses. On this spur the second two-ton electric hoist is kept busy transferring coils from storage to the cradles of the roll feed presses.

The total length of the overhead trackage on which the two hoists operate is 210 lineal feet. The overhead handling system is credited with having reduced former handlings up to 75 per cent, to say nothing of the physical effort that was formerly necessary with manual stacking of the heavy material. The new receiving department at this end of the plant was an important factor in the reduction of ton-miles previously indicated, and hoist handling provided the economical mass-transportation of raw material required by the expanded fabricating and assembly facilities.

Bar stock receiving, at the original dock, has also been improved with an electric hoist installation for unloading from highway trailers. The scale is suspended from the hoist hook above the grab, making on-the-floor weighing (and extra lifting) unnecessary. The storage racks for this stock are adjacent to the screw machine and lathe department. The improvements in easier and safer bar stock handling have been comparable to those indicated for the sheet and coil stock.

#### Using the Headroom

As stated previously, the successive plant additions were not equal to the growth of the business which increased approximately 300 per cent over the volume for which the plant was originally laid out. Packing operations and storage space for packing materials figured considerably in the too-little-space problem. Consequently, the Penn Electric Switch Company's plant engineering department turned its thoughts to utilizing the headroom.

Knock-down cartons, inserts and fillers were formerly stored within cages on the ground floor, which

required hundreds of square feet. This space was made available for manufacturing purposes with the

vas belt is 12 inches wide, with an 18-inch working ledge on each side. The line travels at the rate of two

#### OLD LAYOUT

Travel distance from receiving through fabrication to main stores ..... 1,126 feet

#### NEW LAYOUT

Travel distance for the same piece..... 583 feet

construction of a mezzanine (30' x 280') at a height of nine feet above the ground floor level.

Carton stock is moved to the higher level (from the extreme south end of the plant) via a 50-foot portable rubberized belt conveyor, shown in one of the photos. At the upper level, the material is distributed by hand trucks to the various locations. The location of the transfer conveyor is in an area that adjoins the new receiving department.

The assembled cartons, however, must be delivered from an area that is near the center of the mezzanine floor directly opposite to one of the main packing stations on the ground floor. For this purpose, a gravity chute is provided. It extends over a main aisle and terminates at the end of the oil burner control assembly line, supplying the shipping containers to the packers.

The oil burner stack switches, by the way, are a high production item which previously contributed to the congestion in the packing department. Under the old layout, the completed controls were stacked on load carriers and kept waiting for packing. Now, the finished assemblies are disposed of into the containers as fast as they arrive at the end of the line, whence the loads can be moved directly to shipping. This is another operation that illustrates how flow engineering has contributed to space economy.

#### Conveyor Assembly Has Many Advantages

The assembly of the oil burner stack switches will serve as a typical example of the progress made in the assembly department since the change was made from job shop to production line methods. Conveyor assembly, incidentally, was adopted for all items produced in quantity.

The oil burner stack switch is progressively assembled on an 80-foot-long conveyor table. The can-

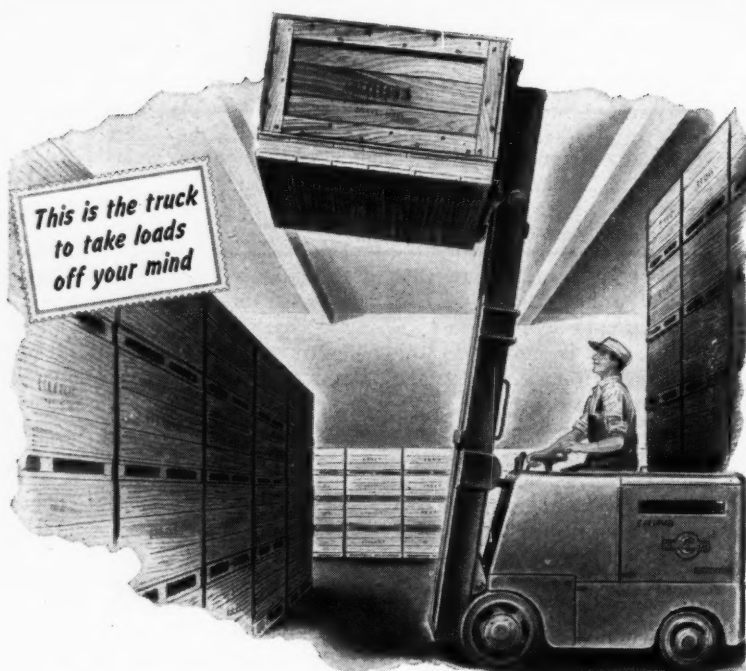
feet a minute. The girl assemblers are seated three feet apart for complete freedom of movement. The line travels north to south, thus terminating (it will be remembered from an earlier part of the discussion) near the shipping department.

The larger components and sub-assemblies are placed in tote boxes at the start of the line, and the operators are supplied by stock boys. Each assembly operator has her supply in a tote box that is placed beside her on a stand of the correct height for convenient removal of the pieces.

At the start of the line, the large parts of the case are assembled first, followed by the electric panel assembly. The latter is brought as a nearly-finished subassembly to the line. As the panels are completed, each operator working on this item places the unit on the conveyor belt beside a case. One of the photos shows the parts traveling in this order. This arrangement keeps the components together and avoids rehandling which would otherwise be necessary later. Pneumatic screw drivers are suspended from overhead holders hung on springs, which keep the tools out of the way when not in use. All fixtures are designed for ease of operation from a standpoint of economy of motion.

About 18 feet from the start of the line is the soldering station, where the electric terminals are affixed. The soldering irons are likewise suspended from springs, which lightens the weight of the tool in each girl's hand. Since each station is vented with an exhaust system, all fumes are instantly withdrawn.

An important part of the assembly line operation is the method used for pacing production. This is accomplished by means of numbered circular markings which are stencilled on the belt at intervals of 24 inches. When several girls do the same operation, the num-



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bered circles require each girl in each group to do an equal share of the work. For example, if Operator A removes pieces from Location No. 8, then Operator B will remove them from No. 7, thus keeping the work evenly distributed.

The close-up photo of the assembly line shows the containers used for very small parts. As can be seen, stack-type and hopper-type feed bins are used for this purpose. In this manner a supply of a variety of small parts can be kept close to each girl in minimum working space, avoiding any long reaches on the part of the operators. The spouts on both types of containers make for easy removal of the pieces.

Another point of interest is that, for reasons of maximum comfort of the operators, chairs with vertically adjustable seats are being installed as rapidly as possible on all lines. Each girl will thus be able to adjust herself for greatest convenience in relation to the level of the conveyor table.

### Personal Belongings Tucked Away

Another point regarding employee relations merits mentioning. For reasons of neatness and safekeeping of personal belongings, a canvas bag is attached on one side to the supporting framework of each chair. Each girl thus has a place for her pocketbook, handkerchief and other personal belongings. Since the latter are kept out of sight, this leaves only working parts on the assembly table, avoiding the untidy appearance caused by personal belongings.

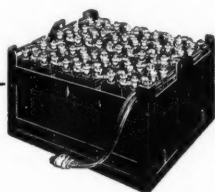
About halfway down the line, following an inspection, the panels and cases are assembled into units. Then comes a series of test stations on each side of the line, where the control is set for correct voltage and amperage requirements. The assembly now weighs four pounds and has an over-all height of 12 inches.

Rejects are placed on a castored double-deck truck for transfer to the adjoining repair bench. A supply of extra control switches is kept on hand at this point for replacement of rejects in order to maintain an even flow of the number of units scheduled. In other words, the extra supply serves to keep the numbered circles loaded in order to

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Illustrated above is a material-handling job for which trucks must be kept on duty 24 hours a day, every working day. It is the kind of job in which battery industrial trucks excel because of their dependability and economy.

With batteries exchanged two or three times a day, the truck is kept continuously supplied with power. While one battery is being charged, another operates the truck.

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The truck starts instantly, accelerates smoothly; operates quietly; gives off no fumes; consumes no power during stops. Thus, it makes efficient use of power, and the current used for charging its batteries is the lowest-cost power available. Its electric-motor drives have a minimum of wearing parts and are inherently simple and trouble-free.

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maintain an equal amount of work for each girl.

Next in line is the electric testing jig and timing table. This ingenious device is a double-tray circular revolving table five feet in diameter with individual timing stations set around its outer edge. Following is a rather simplified description of the essentially complex test performed. The test operator sits at her place in the line (the conveyor table here is carved out to accommodate the arc of the circular table (and places the arriving

control switches on the jig. The safety timing is automatically recorded. In view of the operator is a pilot light which goes out when the test is completed, and the girl records the time in seconds.

The upper tray serves as the cooling board for control switches that must be recalibrated. Notches on its outer edge hold the switches. The cooling board is 24 inches above the testing table and three feet in diameter. This jig, say plant engineers, has easily saved 2,000 feet of walking, as well as much

standing, on each day's production.

Directly behind the revolving test table is the final inspection station for checking all calibrations set by the testers. Here the belt line ends, and from this point it is extended by a 12-foot-long stationary table. On it, the cover installation is made and the packing is done.

It is to this packing station that the chute feeds the assembled cartons from the mezzanine floor, previously described. The cartons are set up with one end taped, the other end open to receive the finished stack control switches. After packing and sealing, the containers are stacked on skids for the short move to the shipping department.

#### Some Final Considerations

Because of its orderliness and logical sequence of operations, it is easy to follow this typical assembly line flow. Once such a method has been in operation for a time, it is less easy to visualize the far-from-orderly progression of the work under the old job shop set-up. That is, how tote boxes of parts and subassemblies were stacked wherever room could be found, how the partly assembled units were carried from station to station, how assembly operators walked around in order to get their supplies of parts, how each operation consumed a maximum of floor space.

By contrast with this old method on stationary tables, it can be realized how the Penn Electric Switch Company without difficulty obtained up to 300 per cent more output from the same or smaller areas through its present method. More, an improvement program often has a way of gaining momentum after initial changes have proved satisfactory. For example, Don Cameron, vice president in charge of production, visualizes material handling methods in relation to records, material control and product design—this with the objective of keeping parts inventories down.

Further innovations are likewise planned in the physical handling procedures. The plant engineering department plans to make further use of the headroom. Part of the extensive mezzanine deck will be

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used for finished goods storage (anticipated when output gradually catches up with orders). For this purpose, according to long-range plans, conveyors will incline from the ends of the assembly lines to an overhead conveyor line running along the balcony floor. From this main belt, deflector arms will route the goods to the various locations for the individual products. And the reversible portable conveyor located at the extreme south end, now delivering packaging materials to the upper level, will probably be used for transferring the finished goods to the ground floor for movement to the shipping department.

It is apparent from the foregoing that the material handling procedures are an integral part of the over-all project—a part essential to the realization of the major objective of the new layout: efficient material flow and maximum productive capacity from available space.

#### NEW COURSES FOR EXECUTIVES AT NEW YORK UNIVERSITY

**E**STABLISHMENT of a new Institute on Systems and Procedures at New York University was announced by Dean Paul A. McGhee of the Division of General Education, the University's School For Adults. A program of three courses will be offered during the coming fall term designed to provide businessmen with practical on-the-job knowledge necessary for simplifying operational tasks.

Dean McGhee explained that the Institute will explore systems and procedures currently being developed in daily business operations. "It is intended for businessmen who recognize that capacity production and sales alone cannot absorb the costs resulting from increased overhead, higher wages, and outdated methods", he said.

The courses are planned to meet the needs of accountants, sales managers, engineers, controllers, and other executives. They have been developed with the cooperation of an advisory committee under the leadership of H. Kenneth Marks, President of the Systems and Procedures Association of America, and partner in the firm of J. K. Lasser and Company. All three courses will meet during evening hours at the Washington Square Center of the University.

#### CUSHIONED SHIPPING CONTAINERS AVAILABLE IN CONTINUOUS ROLLS

**A** NEW type of packaging medium which is reported to cut shipping costs, has been announced by Sherman Paper Products Corp. The new product, which will be marketed under the name of Corroflex Tube-Tainer,

is described by the manufacturer as "Cushioned Containers in Continuous Rolls". The Tube-Tainer is manufactured of Corroflex, a flexible-corrugated cushion packaging material which is widely used in packing. Its advantages of saving time, material, shipping weight and cube, are said to be carried still further in the Corroflex Tube-Tainer, a ready-made container in roll form. Originally developed during the war as a sleeve used in packing palletized shipments of artillery shells, continued experiment and research led to the continuous roll feature of the new product. It is supplied in stock rolls 250 feet long, in a variety of widths. To use it, the packer simply cuts or tears off the correct

length from a roll mounted at his bench, inserts the product, and closes the ends, according to the release. Any standard closure may be used with the new material.

#### REMINDER

The FLOW cost reduction contest closes December 15, 1947. Scores of readers have received entry blanks, and some have already sent in their papers. You have plenty of time to complete your paper, but if you delay you may lose out on the \$1,500 prize money. See the announcement on page 12.

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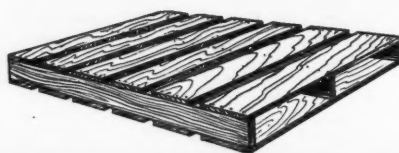
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# ON THE



# PALLET

## NEWS · VIEWS · TRENDS

**THE FOLLOWING** manufacturers of material handling equipment and allied products are exhibitors at the National Metal Exposition scheduled in Chicago for October 18 to 24: Acme Steel Co.; Alvey Ferguson Co.; American Chain & Cable Co.; American Wheelabrator Co.; Automatic Transportation Co.; Bristol Co.; Cambridge Wire Cloth Co.; Cleveland Crane & Engr. Co.; Cullen-Fricstedt Co.; General Electric Co.; A. J. Gerrard & Co.; B. F. Goodrich Co.; Harnischfeger Corp.; P. R. Mallory & Co.; Mine Safety Appliance Co.; Rack Engineering Co.; Rapids-Standard Co.; John A. Roebbling's Sons Co.; Steel Parts Mfg. Co.; Towmotor Corp.; Westinghouse Electric Corp.; Yale & Towne Mfg. Co.

**WENDALL FREDERICK** ("SKIPPER") **HEBARD** passed away on September 4, 1947. He has long been known to many people in the material handling field as president of W. F. Hebard & Co., manufacturers of Shop Mule industrial tractors. Death came accidentally on a stormy night while Mr. Hebard was parking his car. The cause was attributed to a heart attack. He is missed by the many associates in his own business and by people in many industries who have grown fond of him.

**MAURICE HOOFF**, 47 General Production Manager of the Hyster Company and one of the best known heavy machinery production men in the industry, died August 22 at Portland, Oregon. Hooff, born in Holland, had been connected with the Hyster Company, manufacturers of tractor equipment and industrial trucks, since its first day of operation. In many prior capacities, he has been in charge of production at the three Hyster factories—Portland, Oregon, Peoria and Danville, Illinois, for the past several years. Under Hooff's direction production figures of both the tractor equipment and the industrial truck divisions of the Hyster Company reached extremely high totals.

**THE FAIRBANKS** Company announced to over 15,000 buyers and users of material handling equipment the immediate adoption of a firm price policy on all hand and platform trucks, dollies, casters and wheels. The purpose was two-fold. 1. To aid in the eventual stabilization of all prices. 2. To enhance dealers' business relations with their customers.

The policy of accepting orders on the basis of prices prevailing at time of shipment was discontinued and the following policy was put into effect. 1. Prices

quoted by the company will be on a firm basis subject to acceptance within 15 days from date of quotation. 2. All goods shipped against present or future orders will be billed at prices in effect at the date the order is accepted, or prices prevailing at the time of shipment, whichever is the lower.

**EFFECTIVE** August 1, the name of The Mining Safety Device Company has been changed to The Nolan Company, consistent with the company's major brand name of "Nolan" and its long-range integration program. G. W. Merritt, general manager of sales, pointed out that many of his company's products, such as mine car control equipment, have been marketed for many years under the brand name of "Nolan". Another factor which prompted the change was the recent acquisition of the Edelblute Manufacturing Company. Except in very specialized cases, its "Anchor" brand car and locomotive re-railers and puller jacks also will be marketed under the "Nolan" name. The change in no way effects sales or personnel policies. All Nolan Company manufacturing operations will continue at Bowerston, Ohio.

**NOW EVEN** railroad locomotives are getting their regular bath in nothing flat by a mechanical washing machine. The Pennsy has installed the first semi-automatic machine of this type at its Sunnyside Yard, Long Island City. The equipment, operated by four men, is said to give a locomotive its bath in 15 minutes as compared with the almost three hours the job required before. The washing machine is more than 300 feet long and has a height of 15 feet on each side above the track. It is expected that it will scrub and rinse up to 100 locomotives during a 24-hour period. Built by the Whiting Corporation in cooperation with Pennsylvania R. R. engineers, the equipment uses both horizontal and vertical rotary brushes in conjunction with pinwheel sprays for removing dirt from all parts of the engine.

**WORD** has been received that the Wood Pallet Co. of New York, manufacturers and distributors of pallets and other material handling equipment, was scheduled to move on October 1 to new and larger quarters. The company's new address is 232 East 149 Street. S. Silver will be in charge of sales, and T. Held will head the engineering staff.

Reminder: Don't be late in submitting your paper for the FLOW cost reduction contest. The deadline is December 15. See the announcement on page 12.

# 67% SAVING IN TIME AND LABOR

## Acme Uni-Pak eliminates shipping damages, losses, complaints, for New York washboard manufacturer

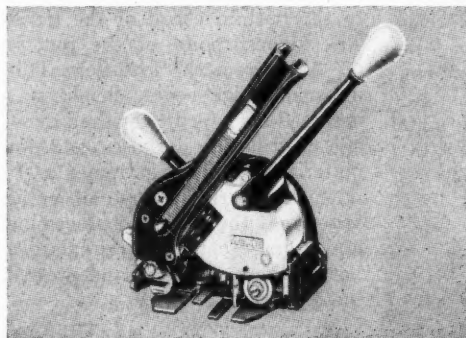
When executives at Albenco Manufacturing Incorporated became alarmed at the high cost of crating materials, labor, and an excessive number of shipping losses, they called an Acme Shipping Specialist. Without charge, he recommended changes that resulted in 67% saving in time and labor, 63% saving in materials, and gave Albenco a better shipping package.

Whether you make washboards or locomotive parts, Acme Shipping Specialists will be happy to advise you on your shipping problems without obligation.

See Acme's record in reducing costs and improving shipping in many industries. Mail the coupon below or write for the illustrated booklet, "Savings in Shipping."



The packing job starts with loose washboards like these. Under the old method a bundle of 12 washboards was nailed together with four 18" wood cleats, two on each side of the bundle. Cost was 7c for cleats, plus nails, per bundle.



More savings ahead for Acme Steelstrap users—No. 3 Steelstrapper, the lightest tool made, is now available. Magazine holds 100 seals. Tensions, seals, and cuts the strap in one operation. Small base requires only 5-inch strapping surface. Two levers working in opposite directions make for better balance and easier handling.

Efficient Acme Uni-Pak method makes a bundle of 12 washboards with two straps to a bundle. Cost of material is 2½¢ each, a saving of 4½¢ per bundle. This type of packaging is three times as fast as the old method.



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OCTOBER, 1947

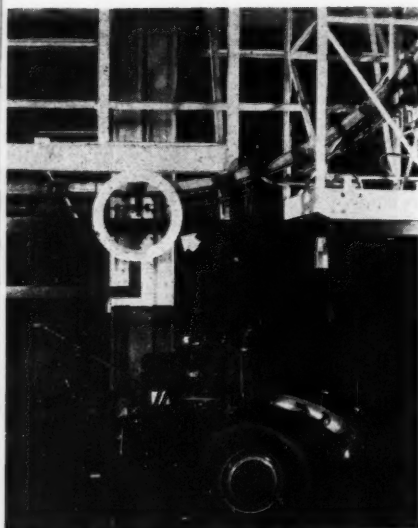


# Floating Storage

AT CHEVROLET-FLINT

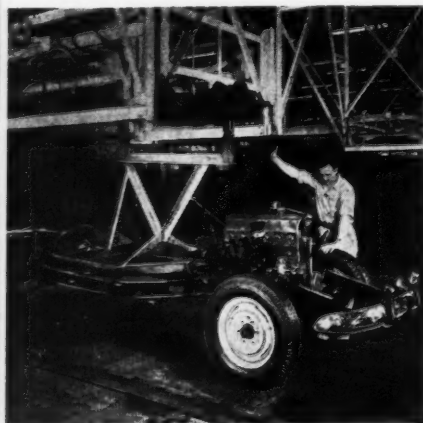
## OVERHEAD CHAIN CONVEYORS

*More than 11,000 feet of overhead chain conveyor—for processing and floating storage of pressed metal parts—are integrated in the material handling system of this newest of Chevrolet assembly plants, designed for a capacity of one car a minute.*



**POWER AND FREE CONVEYOR:** As powered chain inclines, the lug is disengaged from socket on carrier (circle). Carrier then rolls ahead on "free" track, is later engaged by descending lug on chain.

**SUSPENDED ASSEMBLY:** Chassis is lowered to floor conveyor ahead of body drop. Elevator then lifts empty carrier to connect with powered return line.



**Y**OU have to give your imagination free reign when you visit the Chevrolet-Flint Assembly Plant, Flint, Michigan. Imagination is needed in assimilating the advanced design and scope of the flow engineering embodied in this first post-war automotive assembly plant. While one's admiration is excited by the engineering accomplishments in evidence, this is not on the basis of "novelty" aspects of the installation; rather, one's enthusiasm is elicited because, on close and searching inspection, innovations in effect are doing the job for which they were intended.

The over-all operation is distinguished by three novel features. Two of these, suspended assembly and power-and-free conveyors, have been publicized through GM publications and will therefore be indicated here in summary form. The third feature, an overhead conveyor system for processing the floating storage of pressed metal parts, has received very little if any mention so far. This phase of the operation is the subject of the present description. While storage conveyors are fairly common in fabricating and other operations, the application of this principle to automobile assembly is still something of a novelty.

Some quick statistics will help to clarify the layout of this newest and largest of automotive assembly plants which is devoted to three distinct operations. The plant extends east and west and has a total of 1,269,000 square feet on two floor levels. 250,000 of these are taken up (on the extreme south side) by the Fisher Body Plant, feeding Chevrolet passenger auto-

mobile bodies to the body trim line in the adjoining second-floor area. Approximately 550,000 square feet, in the central portion of the better than 1000-foot-long building, are taken up by the Chevrolet assembly operation. This area includes a 900-foot-long section for receiving purposes. (This is also the length of a railroad spur entering the building on the south side of the plant.) The remaining 469,000 square feet, located in the north section, are devoted to assembly of Chevrolet trucks.

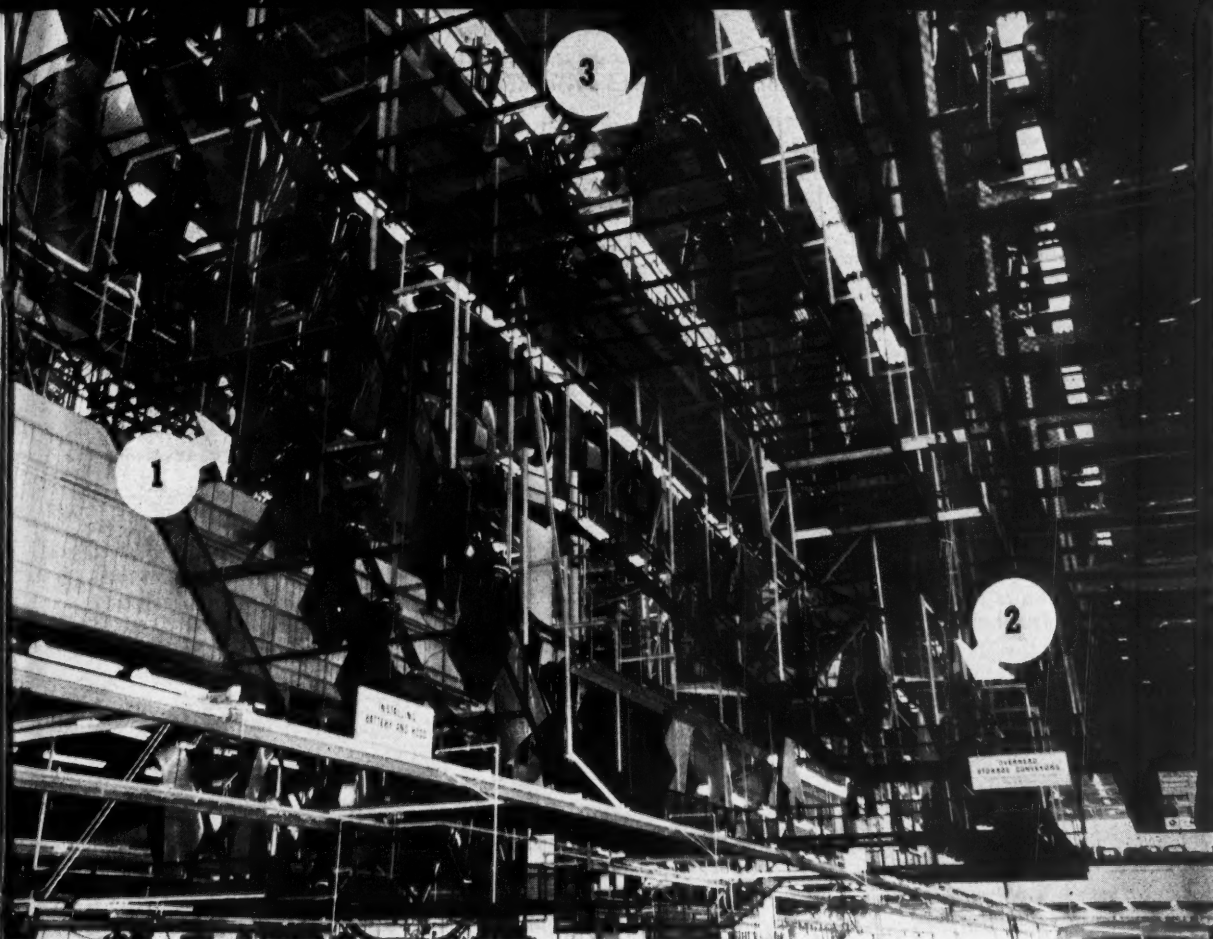
Two-thirds of the floor area in the Chevrolet passenger car assembly area is on the ground floor, the remaining third on the second-floor level. The second floor is broken by an open court, with the court dimensions 60' wide and 36' 11" to the bottom chord of the truss. The highest point of the roof is 53' 3 1/2" from the first floor. This unusually high ceiling height was designed both for better-than-average ventilating purposes and for material handling requirements. It is in this large volume of cubic space that the overhead processing and storage conveyors circulate a vast volume of wheels and pressed metal parts.

### Chassis Float Through Assembly

The plant is designed for an ultimate production capacity of one Chevrolet passenger car a minute and a truck every three minutes—80 units per hour. It stands to reason that this stride cannot be hit until material supply difficulties have been remedied.

**Suspended Assembly:** It is an uncommon sight to observe the chassis traveling suspended from



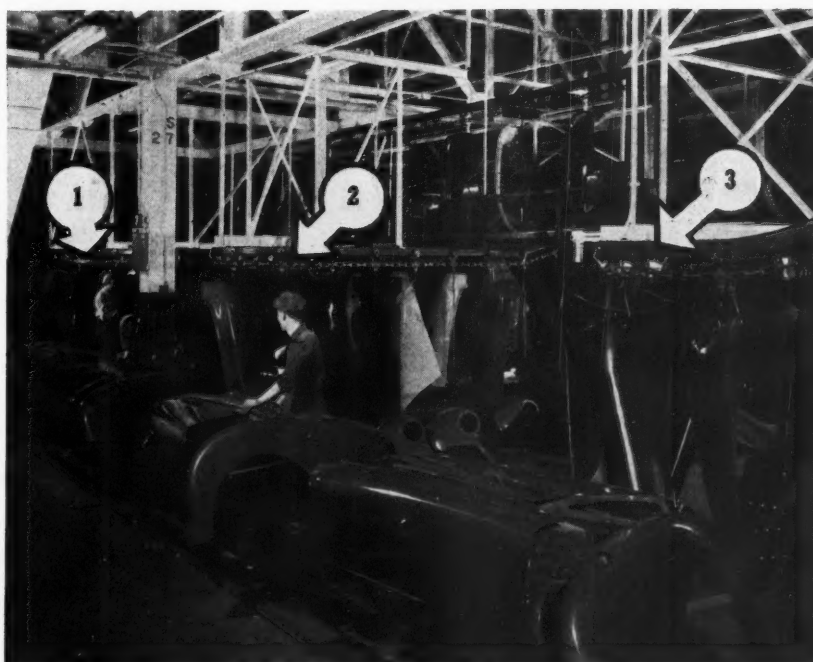


LOOKING UP. Storage loops in headroom. 1. Hood sections. 2. Rear fenders. 3. These two lines for truck metal. Gay colors have festive look.

LOADING POINT of storage lines. 1. Rear fenders, front fender caps. 2. Hood sections. 3. Front fender sections. Lines deliver to sub-assembly.

four-point suspension carriers that are propelled by an overhead chain conveyor, instead of on the customary floor conveyor. As the frame starts out at the beginning of the line (first in a south-to-north direction) the unit travels at a height of about four feet from the floor. As the assembly is gradually built up, now traveling west, the conveyor drops six inches to keep the units properly positioned during subsequent assembly operations. It is just ahead of the body drop that the completed chassis is lowered to a floor conveyor for final assembly over the pits.

Here is how plant representatives state the advantages of the suspended assembly method. A better equalized work level is obtained, since the overhead conveyor can be adjusted to any desired level. The operators can work over



## OVERHEAD CONVEYORS FOR WHEELS AND PRESSED METAL PARTS

No. 1—Washing and Rustproofing. Over-all length, 1050'; spacing of trolleys, 16"; spacing of hooks, 12"; spacing per job, 21'. Speed range, 8 to 48 F. P.M. Drive, three horsepower.

No. 2—Wheel Washer and Prime Paint Dip. Over-all length, 2620'; spacing of trolleys, 16"; spacing of hooks, 48". Speed range, 8 to 40' F. P.M. Drive, five horsepower. Capacity, 200 sets (five wheels each).

No. 3—Wheel Finish Spray. Over-all length, 1525'; spacing of trolleys, 16"; spacing of hooks, 8'. Speed range, 8 to 46 F. P.M. Drive, three horsepower.

No. 4—Sheet Metal Prime Coat. Over-all length, 1850'; spacing of trolleys, 16"; spacing of hooks, 12". Speed range, 9 to 45 F. P.M. Drive, five horsepower. Capacity, 100 passenger sets.

No. 5—Passenger Final Spray. Over-all length, 1498'; spacing of trolleys, 21", spacing of hooks, 7'. Speed range, 8 to 46 F. P.M. Drive, three horsepower. Capacity, 80 sets.

No. 6—Passenger Front Fender Storage. Over-all length 800'; spacing of trolleys, 24"; spacing of hooks, 32". Speed range, 7½ to 44 F. P.M. Drive, five horsepower. Capacity, 150 sets.

No. 7—Passenger Rear Fender Storage. Over-all length, 900'; spacing of trolleys, 24"; spacing of hooks, 24". Speed range, 26 to 76 F. P.M. Drive, two horsepower. Capacity, 400 sets.

No. 8—Passenger Hood Storage. Over-all length, 550'; spacing of trolleys, 24"; spacing of hooks, 24". Speed range, 6 to 36 F. P.M. Drive, five horsepower. Capacity, 138 sets.

No. 9—Front end Delivery. Over-all length 590'; spacing of trolleys, 24"; spacing of hooks, 10'. Speed range, 3½ to 18 F. P.M. Drive, 1½ horsepower. Capacity, 16 sub-assemblies.

The combined total of all conveyors, both on-the-floor and overhead types, is 23,026 lineal feet.

or under the job with equal facility. Because the chassis travel off the floor, a "clear path" is obtained—that is, the operators can get close to the work. During the initial testing period, the method has worked out satisfactorily. Sway (because of suspension) has proved no difficulty, partly because two men usually work on opposite sides, counterbalancing each other. Swing and sway, it was stated, has been practically eliminated, even at the motor shake-in station. The four-point suspension carrier provides a reasonably stable operation.

Power-and-Free Conveyor: This is used at two points—at the start

of the frame and rivet assembly and just ahead of the body drop. Its purpose is to hold one job in the bank ahead of the next assembly operation in line. (See the photos of the suspended assembly and power-and-free conveyor operation.)

The chain conveyor travels seven inches above a box-type rail in which the trolley travels carrying the four-point suspension hook. Spaced 18 feet and four inches apart on the powered conveyor, lugs extend downward from the chain. Each lug engages the locking device on the front of the trolley traveling on the lower box-type

rail. Thus engaged, the carrier or hook is propelled by the powered chain, until the latter inclines. As it travels up, the lug is disengaged, releasing the carrier hook and permitting it to travel by gravity on the power-free box-type track.

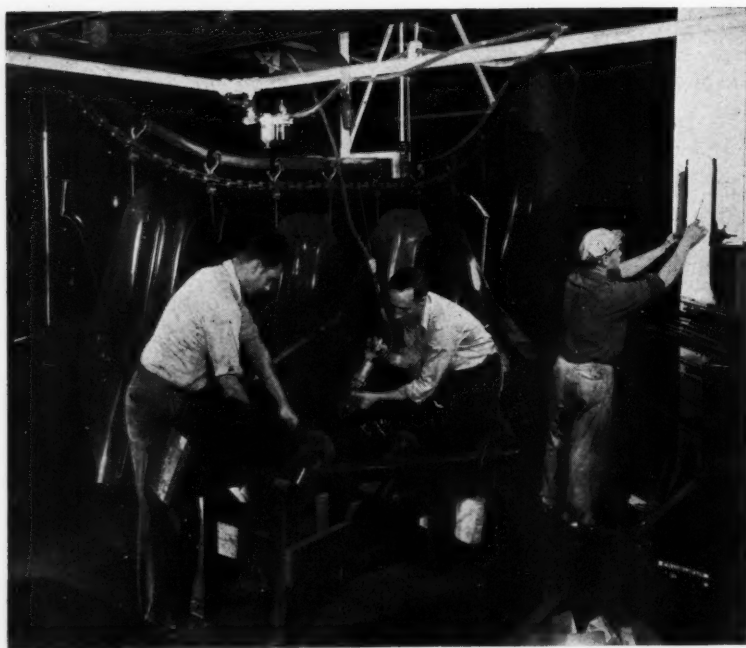
Here is further detail of this arrangement as it is used just ahead of the body drop, where the chassis is lowered to a floor conveyor. The empty hook rolls ahead and (after hitting a pneumatic stop) onto an independent section of track in an elevator. The latter raises the carrier 5' 9" to the continuation of the line. Here the trolley rolls ahead a few feet, and is then engaged by the next passing lug extending from the powered chain conveyor which descends to the proper level at this point. The carrier is thus returned to the start of assembly, where another power-free section of track keeps a unit ahead for the next job.

A simple device is used for suspending the chassis from the carrier. This is done by four guide pins on the carrier which engage four points of the body bolt brackets on the chassis. When the latter has been lowered to the floor conveyor, the operator merely gives the carrier a slight backward push to release the complete chassis.

### You Keep Looking Up

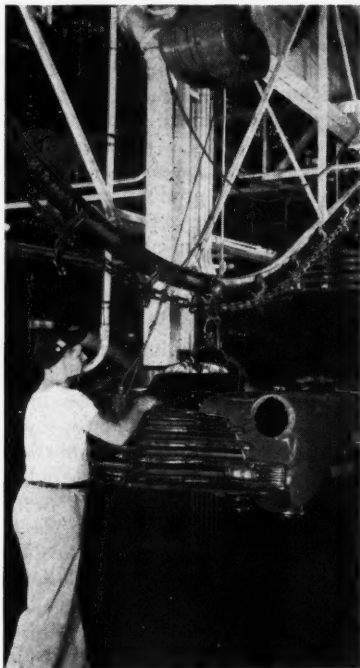
The high roof has a tendency to make one look up into the space designed for the overhead chain conveyor system. In all, nine separate conveyors with a combined length of 11,383 lineal feet are employed for various processing, storage and feeder operations of pressed metal parts and wheels. Specifications for the several lines that make

HOOD SECTION DELIVERY: Teleautograph, right, governs order in which operators remove differently colored sections from moving storage line.



up this system are given in a separate table on these pages.

It may be well to dispose of the two wheel conveyors first, since they function independently of the pressed metal lines. The wheel bank is located near the center of the ground-floor assembly area, adjacent to a 2620-foot conveyor, which is included in the table. This conveyor carries the passenger car and truck wheels (on special hooks, each designed for a complete set of five wheels) through the washing and rustproofing system at the west end of the plant. From here the line travels to the second floor where the wheels are run through the prime coat dip tank, then to the roof drying oven. Overhead ovens, by the way, are used throughout, preventing excess heat from entering operating areas. The return line from the roof loaded on



**FRONT END ARRIVES:** Electric hoist lifts it off delivery line (descending from second floor). Limit switch releases conveyor; next unit descends.

another line (1525 feet long) that carries them through the paint spray booths to receive the final coat. The conveyor carries the sprayed wheels through another roof oven; and from here it returns through a hatchway to unloading points at two banks on the ground floor. Passenger car wheels are taken off on the south side of the

# BRUSCO

## LABOR SAVING MATERIAL HANDLING EQUIPMENT



Fabricated from heavy gauge steel sheets, Brusco Boxes are corrugated for extra strength, reinforced with heavy steel angles and are constructed throughout to eliminate any maintenance expense.

Legs have skid plates for easy moving. Built to last indefinitely. Standard sizes:

24 x 24 — 26½ x 36

36 x 42 — 30 x 48

36 x 48 — 36 x 60

Depth 18", 24" or 30"

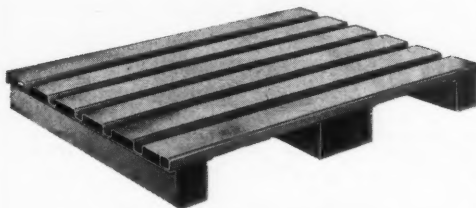
Boxes equipped with card holders for stock records.

Orders or inquiries should specify quantity, width, length and depth of box desired. Also state underclearance required and estimated weight of load. We are able to fulfill any special requirements.

Brusco heavy steel parts boxes are built especially to reduce manual labor, increase production, and to save valuable space. The boxes are rigidly constructed to endure rough treatment and can be tiered easily and quickly.



Brusco corrugated Steel Pallets, single face, box runner type, 3000% capacity each, 20,000% tiering capacity. Size: 36" wide, 48" long — 4" underclearance. Lots of 50 or more \$16.00 each.



Brusco Single-Face Steel Pallet Box-Runner Type

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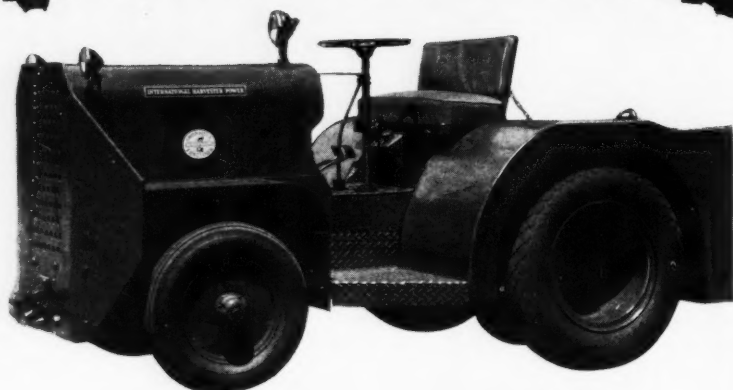
### Other standard BRUSCO Material Handling Products are:

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Power is furnished by an International GRD 233 six cylinder engine. Heavy cast fenders over single or dual drive tires increase drawbar effort up to 12,000 lbs. Four forward and one reverse speed assure smooth operation for heavy pushing or pulling tasks.

Write the manufacturer today for detailed specifications on the new extra heavy duty industrial tractor.

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Dual drive tires with 12,000 lbs. drawbar effort and 240 tons towing capacity on level.

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Single drive tires with 7,500 lbs. drawbar effort and 150 tons towing capacity on level.

93% of expected replacement parts are standard International Harvester items. Parts and Service the world over.

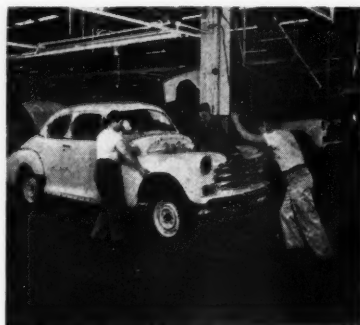


Manufacturers of Shop Mules since 1918.

**W. F. HEBARD & CO.**  
336 W. 37th St. CHICAGO 9, ILL.

plant, adjoining the wheel sub-assembly station. Truck wheels travel across the plant to the north side, where the units are likewise unloaded near the wheel sub-assembly area.

All other pieces—pressed sheet metal parts for passenger cars and trucks—are hung on the cleaning and rustproofing line that travels



Hoist lowers unit on nearly-complete car.

for a length of 300 feet parallel to the spacious receiving area. Here load units of fender and hood sections are arranged in neat rows along the aisle. The parts are hung on the hooks and/or racks in accordance with production requirements, providing a proper proportion of all types of material ahead. At the east end of this area the conveyor makes a 180-degree turn to enter an enclosed washing, degreasing, rustproofing and drying system. (The washing and rustproofing system for wheels, incidentally, parallels the one for sheet metal parts a few feet to the north.)

The washed and rustproofed metal emerges from the oven on the extreme west end of the plant, and through a hatchway the line then ascends to the second floor. In the west portion of this area the conveyor dips for removal of the parts, parallel to another chain conveyor which is indicated by "Sheet Metal Prime Coat" on the accompanying table. In a floor space six feet wide the operators transfer the parts from the first line to the second one. Thousands of feet of conveyor travel are between this point and the one where the painted and polished parts will finally join the automobiles.

The metal is carried on the Prime Coat Line through an adjacent dipping tank, then to an overhead oven located in the same general



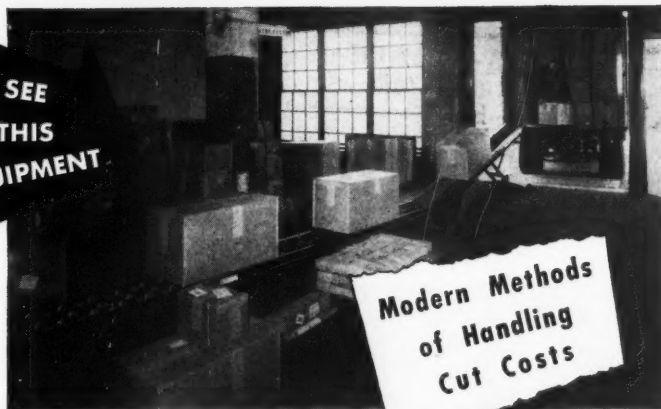
area. The return line forms a loop about 350 feet long, for cooling purposes. Note that this line serves as a prime dip, drying and cooling conveyor. The pieces are delivered at convenient working height about 100 feet east of the original transfer point (from the washing and rust-proofing conveyor).

The return line from the oven dips in this area to form two transfer stations, as follows. 1. In the west portion of the space, the truck parts are transferred to the final spray conveyor, adjacent to its booth. In the east section, the metal is hung on the Passenger Final Spray Line, also with its spray booth close by. Since the passenger car parts are the proper subject of this article, it may be well to follow first the truck parts to their disposal point. After they emerge from spraying and then the overhead dryer oven—about 200 feet east of this area—the conveyor drops parallel to the truck sheet metal delivery line, where the pieces are transferred. This conveyor travels north across the bay to deliver the brilliantly painted pressed metal parts to the proper truck sub-assembly stations on the first floor.

Meantime the passenger car pressed metal parts have entered their spray booth, which is equipped with spray guns for 10 different colors. Several points are of interest in connection with the spray booths. The operators can perform the spraying without wearing respirators. The reason for this is a blower system which constantly circulates the air through filters in such a manner that the excess spray is blown away from the workers toward the waterfall.

Another feature is the use of a Tel-Autograph communication system. Written instructions are received from a master station located at the extreme east end of the plant where the Fisher bodies arrive. These instructions guide the operators as to the colors to apply. The object is to accumulate several sets of one color for reasons of equalized production. At one time, for example, all pieces traveling through the booth will be of a maroon or green shade, with the several successive coats being applied by the operators in the line. More will be said about the Tel-Auto-  
(Turn to page 54)

SEE  
THIS  
EQUIPMENT



(Photo shows Rapid-Wheel Conveyor and Stevedore, Jr., in use at Household Paper Products, Detroit.)

## RAPIDS-STANDARD HAS THE LATEST IN *Handling Equipment*

During the past few years great strides have been made in improving handling methods for all types of industry. It has become increasingly apparent that the easiest and most profitable way to INCREASE PRODUCTION is to reduce handling time. . . . For surveys show that material handling accounts for 30% of the time and 20% or more of the cost in producing any item.

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veyors, permanent and portable power belt conveyors, hand trucks, floor trucks and casters. Their use will reduce handling time and increase production.

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Sturdy endless belt conveyor. Portable — easily moved by one man . . . or can be permanently installed.



**RAPID-WHEEL CONVEYOR**

Portable Gravity conveyor. Extra strong, easily handled. 5' to 10' sections with many accessories. (Rapid-Roller also available.)



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Modern floor trucks for greater handling efficiency. Rugged construction, free running action. Wide choice of wheels.

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Sales Division — 377 Peoples National Bank Bldg., Grand Rapids 2, Mich.

## CONVEYORIZED ASSEMBLY OF MOTORS



*This newcomer to the field of fractional horsepower motors is obtaining high production with planned handling during assembly, testing, finishing and packaging.*

Final build line showing the motors riding on pallet type conveyor through assembly.

SOME months ago Jack & Heintz Precision Industries, Inc., Cleveland, started producing fractional horsepower electric motors, which were for use on the company's own equipment and for the general appliance industry.

In the planning stage major objectives were: 1. Straight line assembly with a goal of 2,500 motors per 8-hour shift, or 100,000 completely assembled units per month. 2. Concentration of major sub-assembly and final assembly operations on one floor. 3. Continuous feed of sub-assemblies to final build line by overhead conveyors. 4. Elimination of motor bank ahead of packing, providing for continuous conveyor flow from production through testing, finishing, packing and shipping.

Today, only a few months after the operation got under way and despite initial handicaps of material shortages, the company has reached a production total of 82,500 units per month. Upon completion of some minor refinements in production and handling procedures, it is expected that the monthly goal of 100,000 will soon be reached. (This is based on the assumption that no new material

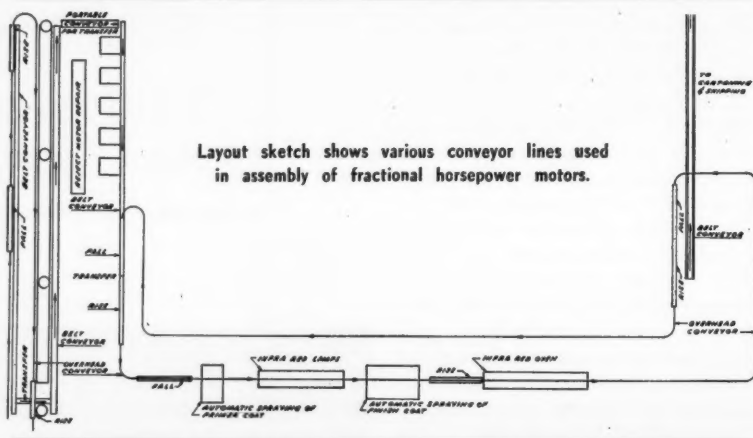
shortages will present additional obstacles.)

The component parts for the electric motors are built into three major sub-assemblies and, as indicated previously, originate in the same room where the final assembly operation is performed. The rotors and end bells are completely assembled in the south section of the plant, while the stators are built in the west area. Two overhead chain conveyors feed these components to the start of the final build line.

Both overhead conveyors are

equipped with adapter hooks spaced on one-foot centers. The hooks are 12-inch-long rods with six-inch-long carry bars at the lower end. Each hook on the south-line carries two rotors and four end bells, (the required proportion for assembly) while the west-line carries two stators on the rubber-covered prongs. (The latter conveyor has two-pronged hooks.)

The final build line is located in the south portion of the room. Here the overhead conveyors converge and dip to shoulder height for removal of the sub-assemblies.



An operator places them on the fixtures attached to the pallet type conveyor which is 80 feet long. Each fixture is built to carry one rotor, one stator and two end bells. The conveyor pallets are one foot square and spaced 10 inches apart. This line travels at a speed of 12 feet a minute and is driven by a 11/2 HP motor.

Stationed along one side of the conveyor are 20 assembly operators, who obtain the screws, nuts and other small needed parts from a six-inch-wide metal tray attached to the line. The motors arrive at the end of the line completely assembled and ready for run-in.

As the flow diagram indicates, the run-in and test operations are performed on two conveyors that parallel the build line. When the motors arrive at the discharge end of the third and last line they have been given a 100% inspection and test and are attached to an overhead line that carries them through spraying and then to packing.

### Run-In and Final Test Lines

A turntable located at the end of the assembly "bench" is used to transfer the motors from this line to the run-in operation. One operator transfers the motors to the turntable while another removes them and places on the run-in conveyor, also a pallet type. Each pallet is equipped with an electrical outlet to allow the motors to be run-in as they move along. An automatic ground test machine is located at the north end (this line moves south to north). As the motors pass the ground test machine, a copper strip contacts the drive shaft of the motor. If the motor is grounded, a light goes on and a horn sounds. Grounded motors are removed and placed on repair benches located in the center of this area. The ground test operator is the only one needed to serve this line.

Transfer to the third parallel (waist-high) conveyor—the final

test line—is also accomplished by means of a turntable. (Incidentally, the turntables supplanted stationary metal-topped tables over which the motors were originally slid.) One operator removes the run-in motors and places them on the table, while a second worker transfers them to the pallet-type final test conveyor.

Four test stations are located at right angles to the line. Four operators remove the motors from the pallets and place them on the test stand fixtures where they are given the full load amp and torque test. Approved motors are placed back on the line, while others are segregated on repair stands.

Beyond the last test station, the conveyor inclines slightly to facilitate the transfer of the motors to an overhead line. The latter dips at this hook-on point and then travels through the spraying operations.

A swivel type hook was designed by Jack & Heintz engineers to car-

### Subassembly Handling

**THE HIGH** production of Jack & Heintz fractional H.P. motors, reported on these pages, is naturally

shape and made rework necessary.

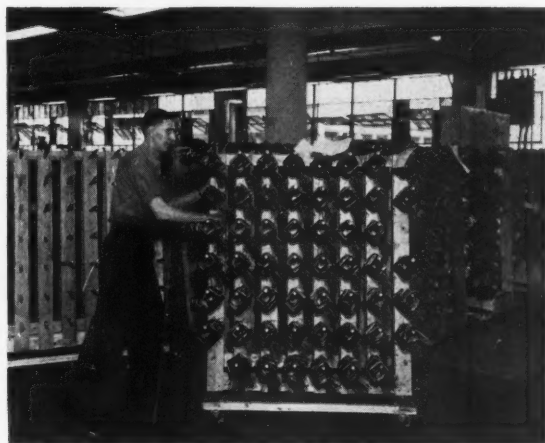
This difficulty was completely overcome by loading the coils on the type of pegged truck shown. It has 96 pegs, banked 48 on each side. Constructed with a wide bottom and narrow top

belt, 18 inches wide with a non-slip surface, is driven by 1/2 H.P. motor. This power unit keeps on the move the wood pallets used for assembly purposes.

Thirty assembly operators are sta-



Soldering capacitor wires on subassembly line.



Pegged and castered truck with load of coils.

dependent on efficient methods for handling component parts and sub-assemblies. Here are two examples of this phase of the operation.

The pegged and castered truck shown here illustrates how a problem was solved relative to a hard-to-handle item—coils for the motors. These are wound on the second floor, and at one time they were piled in boxes which were then sent to the coil insertion department on the first floor. This caused many of the coils to lose their

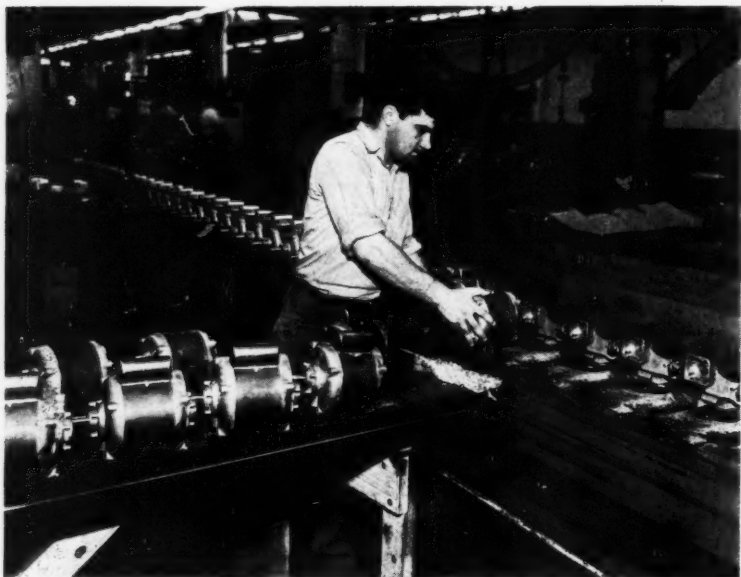
for stability, it measures four feet long, five feet high. The 36-inch-wide base tapers to 24 inches at the top. The new method not only makes possible handling in quantity but provides protection as well.

Efficient mass-handling is also illustrated in the stator sub-assembly line. Shown in the accompanying photo is part of the 30 x 20-foot oblong area which is occupied by a gravity roller conveyor, into which is inserted a powered belt that is 10 feet long. The

tioned along the outer arc of the circuit, with the inner area used for repairs and storage. The two-by-one-foot pallets ride the oval-shaped conveyor line end-to-end. The stators, three on each pallet, are completed when they have traveled around the conveyor circuit. The finished units are removed by the same operator who places them on the line. This operator also hangs them on the overhead conveyor that delivers them to the final build line.



ry the motors through spraying. As can be seen from the drawing, the hook is equipped with a collar. This collar is placed over the drive shaft of the motor and the hook is slipped into the air vent. Thus the collar serves as added protection against slipping while the motor revolves rapidly during spraying.



Hook-up operator placing motor on run-in conveyor. Its pallets have electric connections

The spray booths are located just east of the hook-on station. Originally, while production got under



Placing hook in motor vent and cap over drive shaft to hold motors secure through paint spraying.

way, the motors were spun manually by the spray operators. They used one hand for revolving the suspended motors and the other for operating the spray guns. This caused operator fatigue and necessitated frequent shifting of the men

engaged in the spraying operation. With greater production, company engineers installed powered units which revolve the motors mechanically as they pass through the spray booths. This refinement has been an important factor in balancing the flow between production and finishing.

Beyond the two spray booths (one for primary and one for the finished coat), the conveyor passes through an overhead infra-red drier. From the latter, the line travels north and dips, as shown in the diagram, for removal of the motors to a slat conveyor. While the motors move along this slat conveyor, the base plates, name plates, and inspection plates are attached.

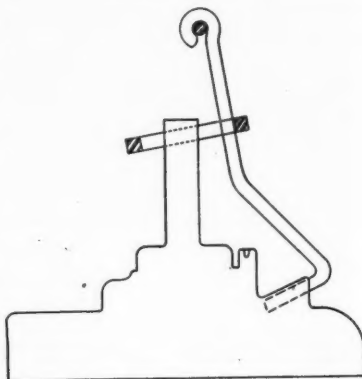
The first operator on this line places the base on two pins which are on each slat. Operator Number Two removes the motor from the overhead conveyor and places them on the base. Operators Number Three through 18 attach the base, insert the keys in the key ways, attach name plates and perform other operations. (Two of these operators stamp out name plates and inspection plates.) As in the assembly operation, the working parts are held in a six-inch metal tray installed along the length of the conveyor frame.

From these final operations the motors pass through a sound test room and then directly to pack-

aging. The packaging layout is designed to dispose of the motors as rapidly as they arrive from production. The first operator in this department lifts the motors from the line and places them in a carton positioned by a second operator. The latter obtains the cartons from an overhead shelf, which is an extension of a chute that brings the set-up containers from a preparation station on the second floor. (Use of a two-floor layout here not only provides convenient gravity feed of empty cartons but is also necessary because of the relatively narrow space of the packaging room.)

The shipping cartons were designed to give the product maximum protection under all conditions. Tests were made by shipping motors over rail, highway and air carriers to see how the cartons held up on arrival at the destination. A 275-pound multi-celled test carton (with four protective inserts) was finally adopted by the company. The inserts cushion the motors and hold them firm during shipping. Only the top insert is placed in the carton during the final packaging. (The others are placed in position at the preparation station.)

From the packaging line, the cartoned and sealed motors pass onto



Diagrammatic sketch shows position of hooks in vent while motor is being sprayed.

a gravity roller conveyor which delivers them to the adjoining shipping room, where they are stacked on 48" x 48" hardwood pallets. Fork trucks transport the loads to the highway truck loading dock on the east side of the building, and



spot the pallet loads directly in the outbound vehicles. Some of the trailers are 36 feet long, which would necessitate considerable



Cut-away of carton designed for maximum protection to motors during rail, truck or air shipment.

walking on the part of the loading crews. This extra effort is avoided by setting up sections of portable gravity conveyors inside the trucks, and the individual cartons pass rapidly through the length of the body to the stackers.

You can see the handling has been planned for every step—in the feed-in of subassemblies, final assembly, testing, finishing, packaging and loading. This planned handling helps explain the high production achieved by Jack & Heintz Precision Industries in a relatively short time.

#### NOVEMBER ISSUE BRIEFS

Packaging Mechanics presents a report on operations in a breakfast cereal department. . . A system for 300 per cent more sand and gravel . . . High-volume production of refrigeration compressors in an exceptionally compact layout . . . Use of rectangular and overhead space is a feature . . . How a progressive plant brings grindstone handling up to date with a pallet handling program . . . Application of overhead chain conveyors in storage, assembly and packing of automotive braking mechanisms . . . These are some of the articles now in preparation for November and early issues.

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# PACKAGING MECHANICS

A regular monthly section in which are presented solutions to the problems of efficient filling and handling the boxes, cartons, bags, bottles, cases, etc., used in commerce and industry.

## Filling Non-Rigid Containers

*Packaging in non-rigid containers has long been a difficult problem. Here's how a potato-chip manufacturer has solved it.*

WHEN Consolidated Foods, Inc., Toledo, Ohio, manufacturers of potato chips, shoestring potatoes, and pop corn products, moved into a newly acquired plant a few months ago, the company adopted the latest type of packaging equipment plus "assembly line" methods. Prior to moving to this building, packing of this product was pretty much a hand operation, as it still is in many plants. The crispness of the potato chips posed a special problem. For instance, they could not be broken during packaging, as this impaired quality. Nor could they be manually handled from the sanitary standpoint. With the present packaging equipment and conveyors the chips move from the cooker, through all operations and into shipping without being touched by hand.

In pre-processing, the potatoes are also handled by mechanical means. After peeling and washing, they are fed to a bucket elevator, which carries them to the second floor for processing. Conveyors are also used for carrying the product through subsequent processing operations.

The company operates three plants (one for popcorn products) and 20 branch warehouses. Its market area covers the western portion of Ohio, all of Michigan, and sections of Indiana and Illinois.

While potato chips are shipped in several types of containers, this article deals with the packaging of five and ten-cent wax-treated paper bags.

### Continuous Flow of Chips

Chips move from the automatic cooker at the west end of the plant



ON THE CONVEYORS: Bagged potato chips move on No. 1 line; Stapled bags on No. 2 belt.

to the bagging feed line on a 42-inch-wide, rubber-treated canvas belt. This conveyor travels overhead for the greater part of its 70-foot length and has a slip-proof surface. Moving at 24 feet a minute, the chips are carried to a 40-

foot package feed belt. This one also travels overhead and moves the material south to the bagging machines. Scraper bars placed approximately eight feet apart shunt the chips to several packaging machine chutes. These are of stainless steel and are eight feet long and 4½ inches wide and pitched at a slight angle. The chips are thus gravity fed to the vibratory trays of the weighing and bagging equipment. The trays are 27 inches long and 4½ inches wide, tapering to three inches at the feed point.

Once the bagging mechanism is set in motion it continues to weigh and dump automatically unless the bagging operator should shut off the control switch. One operator, at each of the machines, places the wax paper bag under the discharge spout. When the correct number of ounces has been dumped, the mechanism stops and the next batch then drops into the weighing hopper. The weighing equipment is adjustable and may be changed to weigh either five or ten-cent bags according to production demands. For the most part, both sizes are run through at the same time.

Empty bags are held in a hopper on the bagger's left, resulting in a smooth two-handed operation. The operator removes bags from the holder with her left hand, positions them under the filling spout, and

removes them with her right hand. Girls become very proficient in this operation, with many of them bagging up to 26 units a minute.



**CHECKING AND BOXING:** At end of line bagged chips are checked for weight and boxed for shipment.

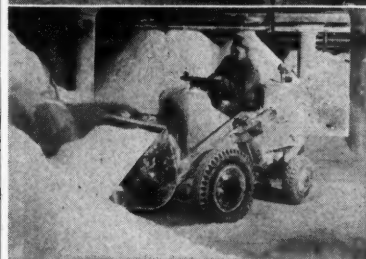
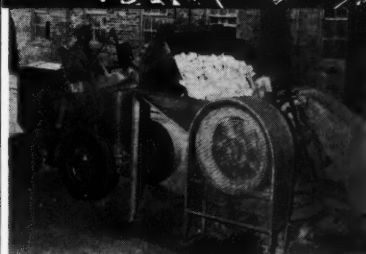
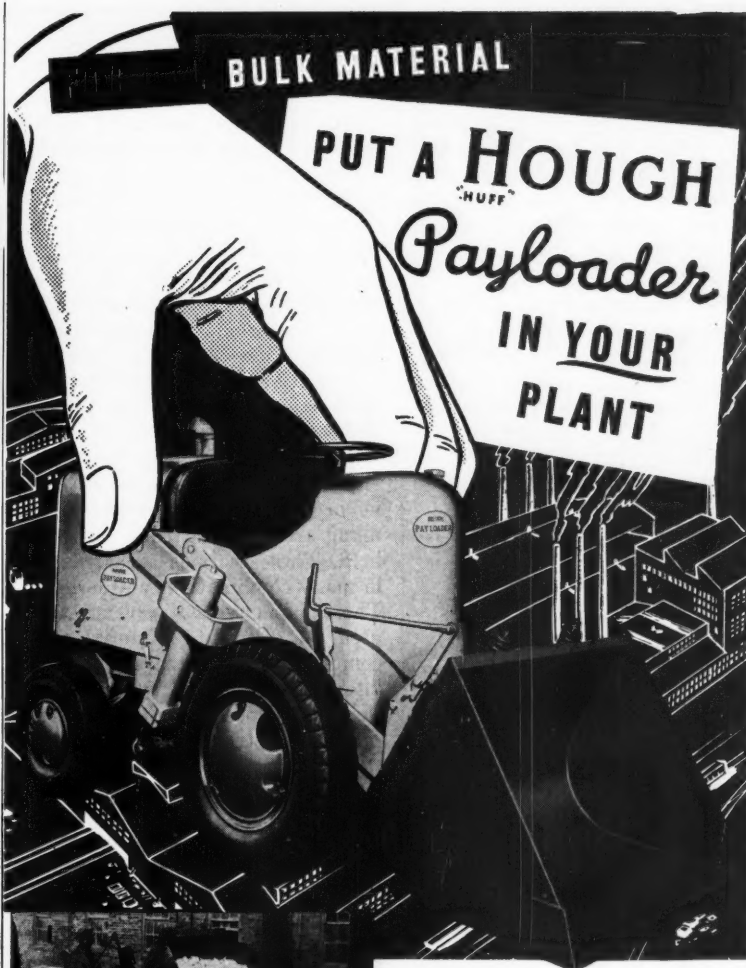
Filled bags are placed on a conveyor, designated as the No. One line on the flow sheet. Guide rails along the entire 45-foot length of this belt keep the bags in a semi-upright position for easy removal. A number of bag closers work along the length of this conveyor. The girls sit at right angles to it, with the flow of material to them. Bags are hand folded and stapled on stapling stands. These stands are 28 inches high and have staple box holders at convenient height for the operators. Motion at the closing station is as follows:

1. Operator removes bag from No. One line with her right hand.
2. Folds it twice with both hands.
3. Places staple in center.
4. Deposits completed unit on No. Two conveyor (see diagram) with the right hand.

#### Shipping the Chips

An inspection operator at the end of the line checks to see if staples are in correct position, bags are in good condition, and checks the weight on 25 bags of every 100. At the inspection station the belt makes a 90-degree turn east and carries the product up a slight incline to the packers, four of whom work in two teams.

Each team consists of a sorter and a packer, working on both sides of the line. The two sizes of bags are separated and placed by the sorter on the sorting table within reach of the packer. The packing tables are 32 inches high and have



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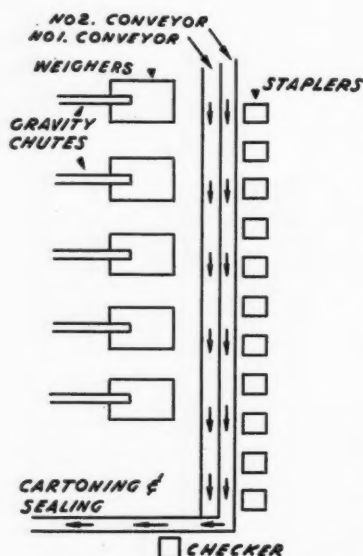


THE FRANK G. HOUGH CO.



## PACKAGING MECHANICS

a slant top to facilitate the operation. Small-size bags are packed five dozen, large size bags three dozen to a carton. One box maker (at the end of the line) prepares



LAYOUT: Straight line packaging shows staplers and conveyor lines that supply operators.

the carton flats and slides them to the packing station over a 16-foot length of roller conveyor.

An eight-foot length of roller conveyor carries the cartons to the sealing operator who uses paper tape. She then places the sealed containers on rubber-tired, castered trucks. Each of these trucks holds 40 cases, which are then moved to the finished products distribution area. Very seldom do cartons remain here longer than 24 hours.

The storage area is divided into several sections according to size and types of packages. Portable roller conveyors help the order fillers. Sections of this type of conveyor are set up from the order filling areas to the truck conveyor belt. These sections are arranged in many combinations and lengths. The same conveyors, reversed, are used to distribute material that comes up from the truck dock. An inter-communication system links the truck dock with the finished products distribution area on the second floor.

From the end of the portable roller conveyor the cartoned goods are carried by a 50-foot conveyor to the truck dock on the first floor. One man is stationed at the end of this belt to guide the containers onto the wheel conveyor built into the bed of each trailer. Two men stack inside the truck. It takes

one hour to load a 30-foot trailer with 600 units.

Consolidated Foods operates on



CONVEYOR IN TRAILER: Wheel conveyors, a part of truck floor, carries cartons 30 feet to stacker.

two shifts. During this time 7800 dozen bags of potato chips are readied for shipment. This means a total of 35,000 units of all sizes of potato products from this plant. (A unit is any shipping container.)

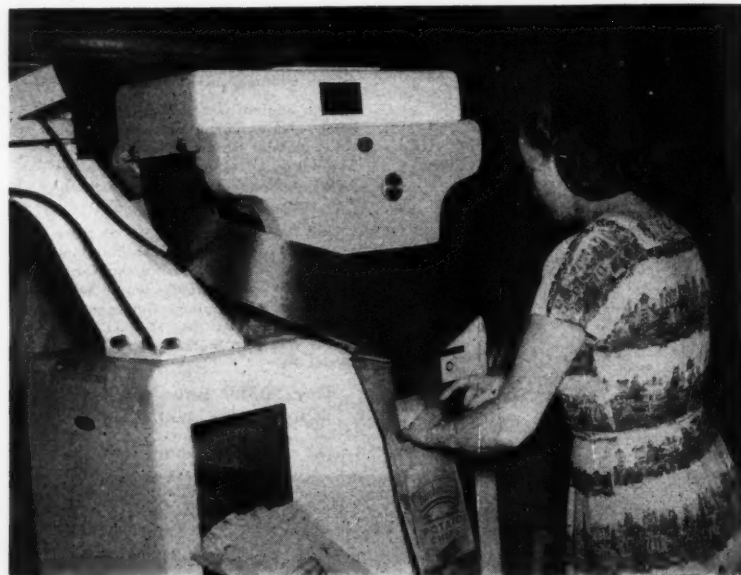
This accomplishment was realized primarily through: 1. Adoption of the latest type of automatic packaging equipment for non-rigid containers. 2. A continuous flow from processing through shipping. 3. Elimination of back-tracking and rehandling. The final result has been a quality product processed in volume under sanitary conditions.

### CASE SEALING

NATIONAL ADHESIVES has issued a comprehensive booklet, "Successful Case Sealing," as part of a broad campaign in cooperation with freight shippers, the Railway Express Agency and the railroads to promote better case and carton sealing.

The booklet is a revised and improved edition of a previous brochure, "Seal That Case," that was prepared and distributed by the company several years ago. "Successful Case Sealing" features new sections based on experience and information obtained during the past few years, when widespread efforts have been made to cut down freight claims resulting from inadequate closure methods.

Such new information highlights postwar developments in the use of synthetic resin adhesives for domestic as well as export case sealing, and in the use of Load-Lok for unitized and palletized glued loads. Other sections



CHIPS—IN THE BAG: Operator at this station positions bag under filling spout of weigher.



describe improved methods of applying shipping labels and way bills to all types of container surfaces.

The booklet has been compiled from the field experience of the National Adhesives technical staff as a practical service guide. Copies are available without charge to all those concerned with shipping problems.

### CONTAINER MARKER

**M**ARKING problems that have stumped shippers and retailers may find their solution in a marking set originated and manufactured by Floquil Products, Inc. The applicator is the conveyor for instantly drying color (16 colors to choose from). There are 12 interchangeable nibs, some split for

## PACKAGING MECHANICS

parallel lining, others producing a heavy  $\frac{3}{8}$ " wide mark. Others are capable of the finest hair line tracing. The vivid transparent colors are said to dry quickly on any surface, wet or dry, including wax paper, cellophane, acetate coverings, and metal foil.

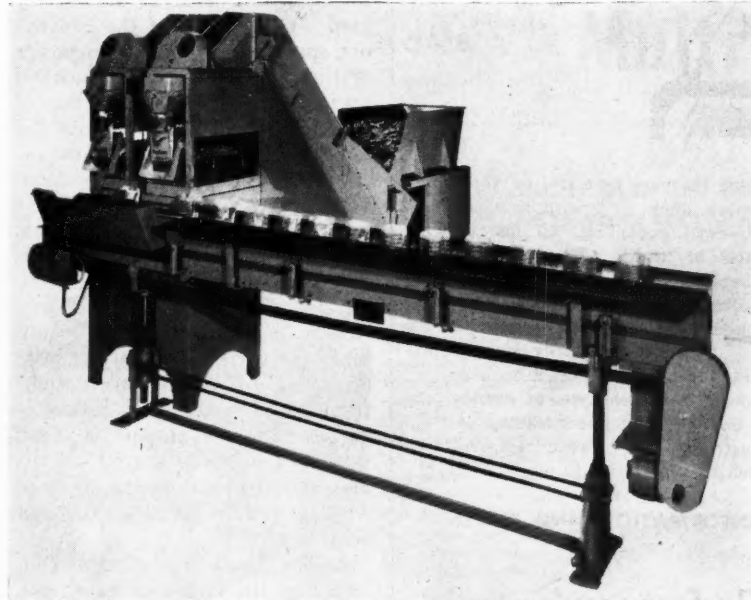
Marking problems in deep freeze units and community lockers may be accomplished with this same marking set using a brilliant purple color, the coloring ingredients being certified safe for direct application to meats.

See the contest announcement on page 12.

### NON-RIGID PACKER

**T**HIS equipment is designed for the filling of non-rigid containers such as cellophane bags and is manufactured by the Triangle Package Machinery Co. As the photograph shows, there is a large

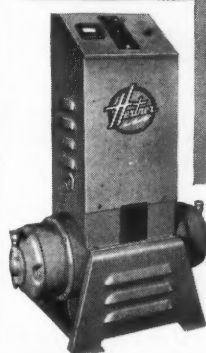
fingers, as the application requires. It is then dispensed by these vibratory trays into the bag that has been placed on the alternately discharging spouts by a single operator. The bag is automatically held in a fixed position, filled to an exacting tolerance and is auto-



bin type storage receptacle which is a rear feed hopper. This hopper is controlled by an electronic device which moves the material forward onto an inclined conveyor. As it reaches the latter it is transported up to the electric vibratory dispensing trays by means of cleats or

atically released to the conveyor on which it is transported to the closing station. The Manufacturer's release states that this machine may handle such hard-to-package items as potato chips, crackers, marshmallows and others.

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## FLOATING STORAGE . . .

(Continued from page 45)

graph system later. Here it will only be added that it co-ordinates the feed-in of pieces of the right color at nine different assembly and sub-assembly stations throughout the plant.

From the spray booth, the emerging line inclines (following the typical pattern) to a roof oven, whence the conveyor arrives (with the pieces properly cooled) some

100 feet east of the previous transfer point. This location is approximately in the center of the building.

As one looks west from here, to the original transfer point from the Washing and Rustproofing Line, the flow pattern stands out clearly. The pieces advance in a straight line over the second-floor area. It will have been noticed that the metal started its journey over the system at the extreme west end, and that it kept advancing east at each successive transfer point until

it reached the central part of the plant, which is the main transfer point to the several overhead storage lines.

### Brilliant Display—Live Storage

As indicated, the processing operations have been completed when the Passenger Final Spray Line declines to the main transfer station in the center of the second-floor area. The conveyor here runs parallel to a 125-foot-long oval floor conveyor which propels polishing fixtures mounted on casters. The pieces are taken off to the south of the oval for transfer to the polishing fixtures. Upon completion of this operation, the parts are then transferred according to kind to the three main storage lines on the north of the oval, as follows:

1. East. This is the conveyor for front fenders (900 feet long, as shown in the accompanying table).

2. Center. Hood sections, left and right.

3. West. Rear fenders, fender caps, and front sill extensions.

Each line supplies the parts to an assembly or sub-assembly station, either on the second floor or to the ground-floor main assembly line. (The lengths of the conveyors, spacing of carriers, horsepower of the drives, etc., can be looked up in the table.) The direction of travel of the three lines from the main transfer point is as follows:

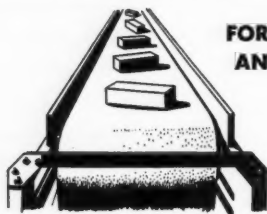
1. The front fenders are conveyed east (on the second floor) to a front-end assembly station. The storage loop is several hundred feet long and front fenders of all desired colors are constantly circling past the unloading point. Since the parts were spray painted according to specific instructions transmitted by the main Tel-Auto-graph station, a proportion of all necessary colors is spaced on the line so that operators are not kept waiting unduly for any particular color needed.

2. The hood sections are conveyed to the first-floor hood sub-assembly station, located between the two main assembly lines.

3. The rear fenders travel over a long storage loop to the body trim line on the second floor. Here the incoming line drops on the left side for unloading of the left rear fenders, then raises and crosses the area to make another drop on the

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right side of the station for unloading the right fenders. The body drop is about 20 feet west of the end point of the body trim line. Incidentally, since the main assembly operation on the first floor proceeds in a westerly direction, the storage and/or delivery conveyors emanating from the second-floor main transfer point maintain the flow in the same direction. Thus, through processing, the parts travel east on the second floor to a central distribution point, and from here west to tie in with the flow of the main assembly on the ground floor. Presently we shall see the delivery lines supplying the main assembly operation.

As one looks up from a point in the western half of the plant, one sees the astonishing spectacle of thousands of pressed metal parts—in beige, maroon, blue, cream, green—circling overhead, in layer above layer or in parallel strands, with every foot below the lines covered by wire mesh guards.

1. The easily damaged parts are stored in space where no one can drop a tool on them or otherwise mar or nick polished surfaces, thus

protecting vulnerable parts. 2. The colors are arranged according to a specific sequence, constantly providing a complete assortment at the points of use. The "live" storage method, besides utilizing space that would otherwise be wasted, keeps a constant supply of material within convenient reach of the operators (without the need of re-handling). 4. Since the lines can be dropped at any desired point, they contribute to efficient utilization of available floor areas. (Recall, in this connection, the progressive west-to-east travel of the parts during initial processing.) 5. Finally, the variable speed drives on the lines permit adjustment to different production tempos. Of course, the saving of floor area through use of cubic space is tremendous.

#### Communications

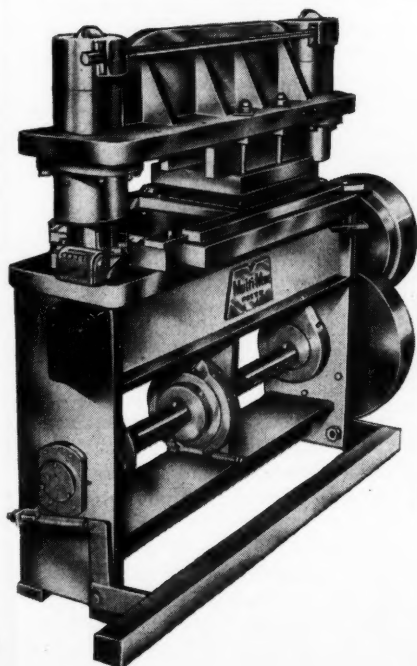
Here is a more detailed description of the communication system that co-ordinates nine widely separated sub-assembly stations simultaneously as to the order in which differently colored parts are to be fed to the main line. The master

station, it was indicated, is located at the point where the bodies arrive from the Fisher Body section of the plant. This operator writes a description of the bodies as they move into the trim line—color, style, and classification. This information is instantly transmitted to the nine sub-stations located throughout the plant. In this manner is governed the order in which the sub-assemblies are built and fed to the main assembly line. As a result, sub-assemblies of the desired color meet up with the body of the same color. Assume that a beige Fleetline two-door sedan is going through the line. As the chassis advances, it is successively met by cream-colored wheels, a cream-colored body, a cream-colored front end and, finally, a cream-colored hood. Orders received for automobiles from customers in the field, and scheduled through Central Office, govern this procedure.

#### Overhead Conveyors Feed Main Assembly

Here is how the overhead conveyors look from the first-floor level

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Stroke.....2"	Guide Bearings (Sealed).....4" dia. x 5" long
Ram Adjustment.....2"	Motor Furnished.....1½ HP, 3 phase
Shut Height (Stroke down, adj. up).....10"	Height of bed from floor.....32"
Strokes per minute .100	Overall Height.....57"
Bed.....12"x36"	Floor Space Required.....36"x75"
Ram.....10"x36"	Shipping Weight (Approx.)...3250 lbs.
Bed Opening.....5"x32"	
Main Shaft Bearings (Heavy Duty Bronze).3	

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as they deliver sub-assemblies or parts to the main assembly line. The front end is delivered by the same type of chain conveyor to the main line, about 200 feet west of the body drop. The conveyor declines here at a point that is equidistant between two pit assembly lines moving west (and about 30 feet apart). Each line is covered by an electric hoist traveling on an I-beam. As the descending sub-assembly reaches the bottom of the dip, it comes in contact with a limit switch. The latter automatically stops the overhead conveyor until the front end has been removed by hoist for assembly. When the unit has been lifted off the line, the switch automatically releases the conveyor and permits the next sub-assembly to descend to position.

Seventy-five feet west of this station, the automobile-to-be arrives parallel to the hood sub-assembly station. About 40 feet long, it has a capacity for four sub-assemblies, the order of the colors being of course controlled by the communication system. From overhead, the hood sections arrive just south of this station, within convenient reach of the operator who reads the Tel-Autograph messages that are transmitted from the master station. The return line travels in a tremendous loop over the main bay, then crosses over the second floor to circle past the loading station in the main transfer or distribution area.

From the hood sub-assembly station, it is approximately another 300-foot stretch where the Chevrolets receive final assemblies and adjustments. Following a photo-electric cell test for focus of the head lights, the cars are driven off into the test ground, immediately adjacent to the west of the plant.

The first Chevrolet rolled off the new lines on June 1st of this year. As the usual new-plant problems are being ironed out, the cars are being driven off the line in increasing numbers, though the goal of a car-a-minute is necessarily dependent on the easing of material shortages.

This description is designed to give you an idea of the part played by the overhead processing-storage-feeder conveyor lines in this brilliantly planned and executed material handling system.



## ONE-MAN CONTROL . . .

(Continued from page 29)

scales for sand, stone and slag are set manually, though they operate electrically.

To assure quick delivery to the trucks, compressed air forces cement from the bin, breaking up any lumps. Vibrators on the other charging bins make sure that a correct measure is released at all times. The method is the same whether a truck requires a complete ready-mixed batch or only one type of material. It takes only one minute to charge a mixing truck with 10 yards of the various ingredients for a batch.

This type of installation is said to be one of only few operating throughout the country. The management of the South Euclid Concrete Company expressed itself favorably about the use of this system and the resultant operating advantages.

## KELLOGG'S CENTRAL WAREHOUSE . . .

(Continued from page 26)

of several dozen different dimensions containing 141 different kinds and sizes of packaged cereal products.

### The Fork Truck Fleet

A fleet of 16 3,500-pound fork trucks is employed in the warehousing operation. First, here is a breakdown of the space allocation in the extensive building. The actual area available for warehousing is 180' x 800', with the remaining part devoted to office space. The train sheds, running the full length of the building on the north and south, take up 27½ feet on each side. A loading dock 10 feet wide serves each track.

In the warehousing area a total of 44,000 square feet is taken up by aiseways and operating areas, leaving 100,000 for storage purposes. The main working aisles run the length of the warehouse at one-third the distance of the width. These are 12-foot aisles. At intervals of 120 feet (in the east-to-west direction) are eight-foot side aisles, which connect with the loading docks at the north and south sides of the huge plant. Five-foot wide fire aisles are located midway be-

**A**N INTERESTING use of conveyor belts is reported by The B. F. Goodrich Company at one of the largest sand and gravel plants in the

42-ounce with center-to-center distance 208 feet.

Conveyor No. 2 operates on 176-foot centers, picks up aggregate from the



West. The conveyor system utilizes six conveyor belts, of different sizes. It has operated eight hours daily, eight months a year for the last six and a half years. Plans are now in preparation to keep them operating throughout the year by stockpiling gravel.

Designed to handle 1000 tons of pit-run material an hour, the plant hourly produces about seven carloads of the finished product for use by a western railroad.

No. 1 conveyor hauls the pit-run product after it is dumped from a 13-cubic-yard trailer and carries it to two vibrating screens and a gyratory crusher. The belt is 42-inch, five-ply,

crusher and discharges it to four finishing screens. The belt is 48-inch, five-ply, 42 ounce. Material more than 1¾ inches thrown out at the finishing screen is returned to the crusher by the No. 3 conveyor which utilized a 24-inch, four-ply, 32-ounce belt.

Finished ballast is handled by conveyor No. 4, which takes it from the finishing screens to the loading belts. It operates on 155-foot centers, with the belt 42-inch, five-ply, 42-ounce. Two other belts, one operating on 200 and the other on a 40-foot center, carry waste fines and sand for stock piling.

### Lift Truck Attachment

**A** PROBLEM at the Magee Carpet Co., Bloomburg, Pa., was the loading of boxes of finished products into freight cars. These boxes weigh



up to 1,000 pounds and are up to 18 feet in length. The accompanying

photo shows the solution—a lift truck attachment consisting of a crane arm, hook and grappling tongs. Three layers of boxes are loaded in the usual fashion. The fourth layer is loaded by the truck. The tongs are placed at one end of the box which is then lifted over the third box. Next, the tongs are moved to the other end, which is brought level. The container is then pushed forward into final position by means of a "nose", a detachable part of the crane arm. This method is said to have produced several improvements. 1. Reduced loading time per car. 2. Full utilization of load capacity of freight cars. 3. A greatly increased safety factor, since lifting strains and similar hazards were completely eliminated. — Courtesy, Towmotor Corporation, Cleveland.

### DON'T BE LATE

The FLOW cost reduction contest closes December 15, 1947. You have time to complete your entry, but don't delay. You need not wait and can send it in as soon as it is ready. See the announcement on page 12.

tween the side aisles.

Following are the operational data on the 16-unit fork truck fleet. Three trucks are sufficient to warehouse all the material palletized at the two revolving tables. (These trucks also supply empty pallets to the sorting operators.) The pallet loads are decked three high, 18 feet to the top of the load. The plant, incidentally, works in an around-the-clock operation.

Eleven fork trucks are used for loading the cars on the 36-car capacity tracks, 18 cars on each side.

The daily loading operation involves between 45 and 60 carlots. The pallet loads are run into the cars, and the individual cases are loaded to maximum visible capacity. One fork truck, No. 15, is used for unloading cased material arriving from a branch factory. The sixteenth fork truck is carried as an "extra" for maintenance purposes.

The Kellogg Company places particular emphasis on preventive maintenance for its truck fleet. This is important in any operation, but especially so in one working 24

hours a day. Each truck is equipped with an engine hour meter, which shows the actual hours of running time. At the completion of each 100-hour operating period the truck must be run into the garage for engine maintenance checkup. This includes a complete

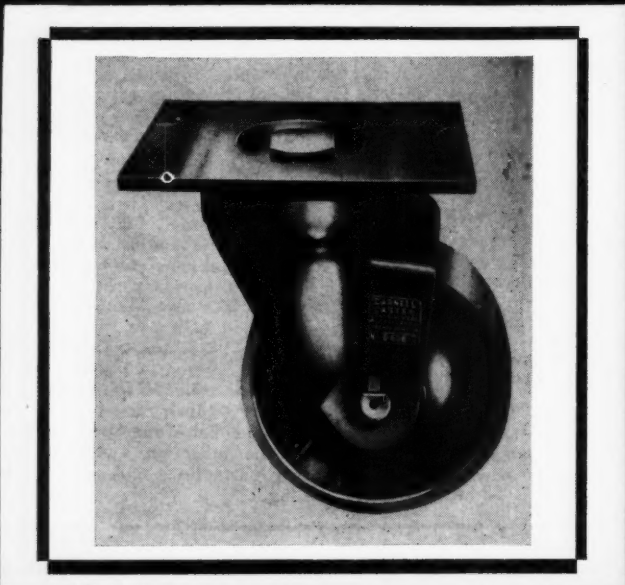
#### Mechanically Speaking

Each of the conveyor flights is driven by an individual motor, with a 20 horsepower drive on each of the two 1,400-foot sections. At one end of each belt line is a vertical take-up which compensates for expansion of the belting under different conditions of temperature and humidity. The lines normally operate at a speed of 170 F. P. M.

In the 10-foot-square bridge the conveyors run 30 inches above the iron deck. The guard rail, four inches high, has a rolled edge. A 40-inch-wide aisle is between the two parallel conveyor lines, with an 18-inch maintenance aisle on each side.

At intervals of 150 feet along the entire length are located electric switch boxes for emergency shutdowns. All sections of the conveyor from the case sealers to the sorting tables (at the receiving point) are interlocked. Thus, if a sorting table is shut down for any reason, all conveyors, including the case sealers, are stopped at the same time. To start this series of conveyors and the case sealers, it is necessary to start the sorting table first and then each conveyor section, back to and including the sealer.

cleaning of the vehicle by hot water with a pressure hose. The job also provides a complete greasing, oil change, spark plug check, distributor check and, among other inspections, a check for change of oil filter. This systematic maintenance schedule prevents unexpected breakdowns, enables the company to obtain maximum machine-hour production from each piece of equipment. Payoff: The units of the fleet have been in continuous



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- Patented Double Ball-Bearing Swivel®
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24-hour daily operation since September 3, 1946, without a major overhaul. The garage has mechanics on duty, one on each shift, 24 hours a day.

It is apparent that a supervisor responsible for the many cars being loaded in the daily 24-hour operation would have to do an exceptional amount of walking in the large plant in order to keep in touch with all the loading crews. In fact, walking would be too time-consuming an effort interfering with efficient supervision. Hence, the company has motorized the warehouse shift foreman, who travels around the plant on a motorized scooter. (See photos.) In a small side car he keeps his book of orders and, occasionally, he uses it to transport a man to location. This fast intra-plant transportation enables the shift foreman to maintain close supervision over loading and warehousing operations in all sections of the warehouse. The efficiency of the operation has been definitely increased because of this scooter, according to Plant Manager R. S. Poole and Supervisor Clinton Stringham, Shipping Division.

In a food warehousing operation scrupulous cleanliness is a major



**IMMACULATELY CLEAN.** This is a full-time daily job for the operator running this powered sweeper.

consideration. The thorough washing job performed at regular intervals on each fork truck is one example. Another item in this connection is the systematic cleaning schedule maintained in the ware-

house. A full-time operator sweeps all floor areas with a power sweeper which has a 36-inch rotating broom. The machine is also equipped with a water spray attached for use in dusty areas, but this is seldom employed.

#### Other Points of Interest

These are the main flow and operational features of Kellogg's centralized warehousing and shipping operation. Following are several additional highlights. Each fork truck is equipped with two

headlights for use in car loading, making it unnecessary to use extension cords. Fork truck operators are required to load the cars themselves. The theory behind this is that "it is more efficient to keep a piece of equipment waiting than a loading crew." The Shipping Division offers figures to substantiate this theory.

At the west end of the plant is a 190' x 40' section projecting beyond the 800' long warehouse area which houses the service garage and eight truck-trailer stalls, in addition to the offices and service areas. The

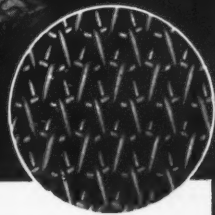
## Cambridge BALANCED BELTING

### Permits quick, sanitary processing of foods

Cambridge Balanced Belting is a "food packers' belt" in every sense of the word—yet it serves with equal efficiency and economy in ANY manufacturing process involving materials handling. In the operation illustrated, this flexible metal, open-mesh belt provides free drainage of liquids and allows circulation of air for quick drying or cooking. It can be woven of any metal or alloy—thus assuring a non-contaminating conveyor medium. Find out how Cambridge Balanced Belting can help you handle or process your products—quickly, efficiently—at reduced operating and maintenance costs. Write Dept. 20 for details.



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The alternate spiral construction and crimped wire connection of Cambridge Balanced Belting provides a smooth, non-bulging carrying surface.

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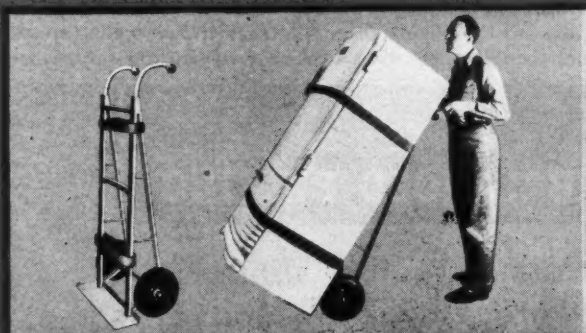


# GENERAL

## INDUSTRIAL PNEUMATICS

... SPEED PRODUCTION

... INCREASE PLANT EFFICIENCY



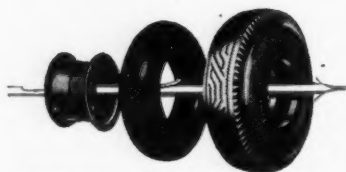
New type HAND TRUCK—Equipped with General Industrial Pneumatic Tires—Manufactured by The American Pulley Company, Philadelphia, Pa.

**MOVE MORE LOADS, FASTER, EASIER, SAFER**

In buying or designing new material handling or other mobile equipment—Study these advantages of General Industrial Pneumatic Tires:

*General Industrial Pneumatics . . .*

Move loads faster and more economically . . . Protect floors and floor coverings . . . Roll easier over soft ground or rough surfaces . . . Protect fragile, easily damaged loads . . . Guard against spillage due to shocks or bumps . . . Roll silently—Eliminate noise . . . Eliminate shock and jar to operator . . . Designed for both high and low speed.



Factory assembled units: Heavy-duty Tire, Separate Tube, Heavy Duty Demountable Wheel and Rim; 8" to 22" o. d. for loads of 180-1900 lbs. per tire.

Wide base rim design, originated by General, has greater load capacity, guards against side-sway, permits low-bed mobile equipment design with low center of gravity that provides stability and straight-tracking in trailer trains. General has the **ONLY** demountable wheel. Separate heavy gauge inner tubes guarantee maximum air retention.



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**INDUSTRIAL PNEUMATIC TIRE • TUBE • WHEEL UNITS**

warehouse is in touch with the main plant by telephone, pneumatic tube and an inter-office communication system. Thus the 2,100-foot distance between manufacturing and warehousing presents no difficulty. For example, if Sales has a jobber on the phone who wants to know when he is going to receive his carlot of cornflakes, the sales representative talks to the warehouse office on the intercommunication system and gets the car number, which is given immediately to the customer waiting on the phone.

And the conveyor system makes possible the receipt and sorting of the cased goods at a considerable distance from manufacturing. As the cases are fed to the revolving tables over the two-lane conveyorized highway, the pallet loads in the warehouse are going up to the rafters and the freight cars in the train sheds are loaded in numbers unprecedented in the history of the Kellogg Company. Throughout, there is a minimum of human effort in moving a maximum volume of goods at the lowest possible per-ton cost. And, manufacturing isn't crowded by storage. The new warehouse provides all necessary storage room without congestion and confusion.

Said Vice President of Production W. P. Butler in summary: "The new system was necessary in view of our production increase since the war. The addition of production equipment locally required the removal of storage from the factory and the construction of a special-purpose building for warehousing. It's the first building we have been able to put up since 1938. While handling has been reduced, as compared with the old method, we feel our operation is still too recent to give any final figures on specific savings. But we do know that savings accrue not only in handling but also in traffic and warehousing operations. In addition, our centralized warehouse has enabled our company to keep the goods fresher, to make deliveries much more promptly, and we have the stock under our own control. We have built another warehouse installation in Canada, and our plants in Great Britain and Australia will be similarly equipped."



# Fish... ON THE HOOK

***It's a hoist hook. Electric hoist speeds fish handling, makes for a safe operation, reduces truck waiting time.***

A NOVEL method of unloading fish from boat to dock was introduced recently in Port Washington, Wisconsin.

Joseph Cayner, owner and operator of the 52-foot Diesel powered

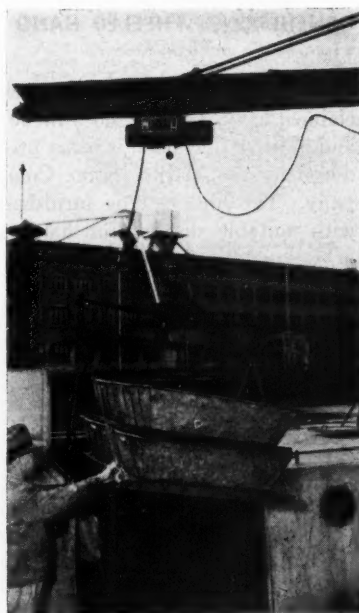


lake fishing tug, "Mar-su," felt there was too much lost time in unloading the day's catch.

It was a laborious two- or three-man job to lift the fish tubs from boat to dock and dock to truck. The job was both difficult and dangerous because the tubs often weighed as much as 250 pounds. The danger of personal injury or spilled tubs was always present as the boat rolled at the dock.

After investigating several handling methods, Cayner finally decided on an electric hoist as the most suitable for this job. Working with hoist engineers, a simple and inexpensive installation was

planned. It consisted of a standard 1000-pound electric hoist, trolley-mounted on a 15-foot industrial jib.

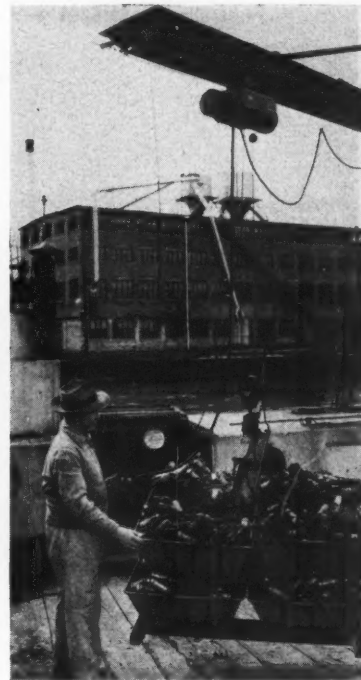


This provided a 30-foot swing radius, more than ample for all unloading operations.

The electric hoist is push-button controlled and can be operated either from the boat or dock. Cayner reports that since installation of the hoist, unloading time has been cut one-third, making it possible to get fish to icing rooms quicker. Instead of handling just one loaded tub at a time as formerly, the hoist easily lifts four. Physical exertion has been eliminated.

The photographs show the new method of handling. Tubs are stacked and lifted through the hatch. Then the jib is swung over the truck. The operator lowers the load, controlling the operation simply by pressing a button. The unique auto-spring arrangement shown in the picture was devised by Cayner to absorb boat motion.

The hoist is called upon to do more than just unload fish. It is also used to handle both wet and



dry nets and for placing empty tubs aboard. Another benefit of hoist-handling of fish is decreased idle time of the truck at dockside.

The hoist is well suited for this job. Its push-button control provides easy, accurate, fast lifting and lowering. It is weatherproof, an important feature in this case because of the extremes of weather found in this Lake Michigan region. Ice, snow, rain, heat or cold don't affect its operation. Also, no special installation problems were encountered because the hoist operates on all lighting circuits.

The unusual success of this new handling method has aroused great interest among other fishermen.—*Courtesy, the Harnischfeger Corporation, Hoist Division, Milwaukee.*

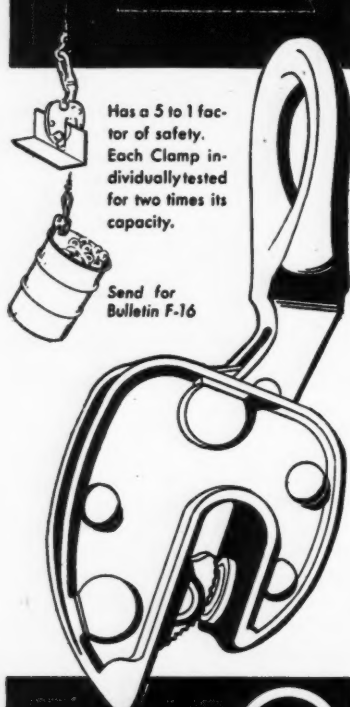
# VOLZ DROP FORGED Clamp

(a Merrill Product)

Picks up any  
flat surface object

Safely — Rapidly  
Easily

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Has a 5 to 1 factor of safety. Each Clamp individually tested for two times its capacity.

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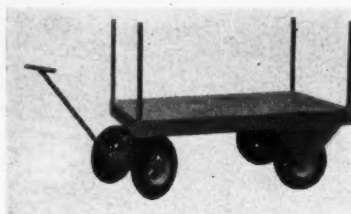
56-70 Arnold Ave., Maspeth, N.Y.



For additional information on these products, write Dept. 5, Flow Magazine, 1240 Ontario St., Cleveland 13, Ohio.

## PNEUMATIC WHEELED HAND TRUCK

**NP128**—A standardized truck claimed to be suited to both indoor and outdoor operation is being produced by the Market Forge Company. The unit can be furnished with suitable devices for hauling

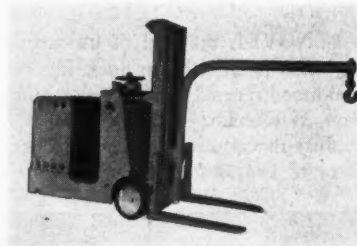


by tractor, truck or auto. Specifications are as follows: 30 inches wide; 60 inches long; height above floor 22 inches; 16-inch diameter pneumatic wheels; 2500-pound capacity. The truck is constructed of steel, the deck is one piece with side members integral. It may be equipped with a number of standardized load carrying units, the release states.

## CRANE ARM ATTACHMENT

**NP129**—This attachment is said to fit all power fork trucks manufactured by Lewis-Shepard Products Inc. It has a minimum length of 24 inches and is built in standard models and increments of six inches to a maximum length of 72 inches. The crane arm may be mounted between the forks and operated as a separate unit or in combination with forks, according to the release. Material to be han-

dled with the crane arm is picked up with a sling attached to the crane hook. Suggested uses by the



manufacturer are: lifting warp beams in and out of looms, unloading gondola cars, and removing dies from presses.

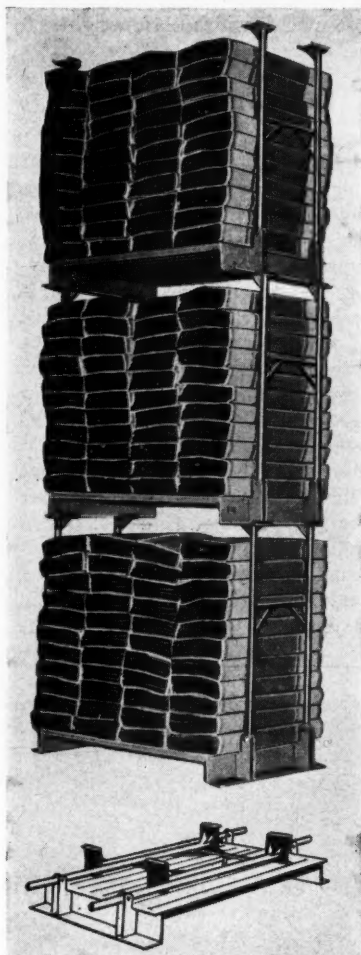
## SETTLING TANK CLEANER

**NP130**—For completely automatic removal and transfer of sediment from settling tanks without removal of fluid, a new mechanism known as the "Houdaille Conveyor" is being marketed by the Honan-Crane Corporation. This unit is basically an endless link-chain, motor-driven, on which 4-inch neoprene rubber flights are mounted at 6-inch intervals. It operates through the V-bottom of the settling tank, trapping the sediment between flights and conveying it through a 4-inch pipe-line to a disposal point. The conveyor is driven through a chain-and-sprocket transmission from an electric motor and gear reduction case. According to the release, the speed of operation is about two to three feet per minute.

## PALLET STACKER

**NP131**—The Elizabeth Iron Works' Multi-Stak Pallet Stacker

unit is now being distributed after two years of practical testing by the manufacturer. The item consists of an all-steel pallet and a col-

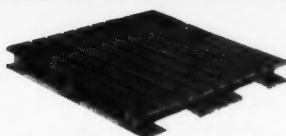


lapsible self-contained attachment for stacking of crushable or varying sizes of merchandise. When in use, supporting standards lock in an upright position to hold the pallets, placed one above the other. No weight is placed on the merchandise itself. According to the manufacturer, the loaded pallets may be placed on top of one another as high as the fork lift truck or ceiling will permit. When not in use, the supporting standards fold across the top of the pallet for compact storage in a minimum amount of space. The unit has a capacity of 4,000 pounds and is manufactured in several sizes, for bulk and heights.

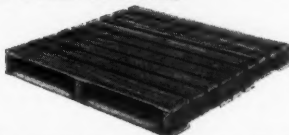
OCTOBER, 1947

## PROMPT SHIPMENT AT LOWEST PRICES ON ANY PALLET

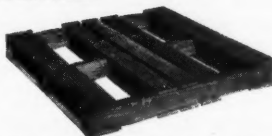
ORDER FROM 1 CAR to 100 CARS!



No. 1—Stevedore, or Cargo Pallet. Non-reversible, double-faced, with over-hanging deck boards to permit use with sling.



No. 2—Standard Double-Faced Non-Reversible Pallet. Slatted deck design. Bottom boards are slatted to permit entry and elevation by either hand-truck or electric fork trucks.



No. 3—Reversible Double-Faced Pallet. Both upper and lower deck boards are spaced to permit entry of pallet trucks.

What are your pallet requirements? Write, wire or phone for prices on our line. We believe we can offer a lower quotation than any other pallet company in the country . . . and furthermore make **PROMPT SHIPMENT!** Ozark Pallets are outstanding in constructions and utility. They are everything you demand in a pallet. Contact us now.

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CHAMFER END BOARDS FOR EASY TRUCK ENTRY

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## HANDLING ACIDS

**NP132**—A safe method of acid handling is claimed for a manually operated acid pump by the General Scientific Equipment Company. No tilting of the container is necessary and danger of a slip, a splash or a spill is minimized. The pumps are supplied in hand- or foot-operated models. Either can be equipped with a lead tube for sulphuric, hydrochloric, hydrofluoric and similar acids or with a Saran (flexible plastic) tube for nitric, phosphoric, acetic acids, peroxide and many other liquids. Special tube lengths can be supplied.

## CHARGING EQUIPMENT

**NP133**—The Edgar E. Brosius Co., Inc., manufacturer of charging equipment for the iron and steel industry, announces that it has modified several previous designs to permit a wider range of uses for its auto floor box charging equipment. Announced modifications are designed to meet handling problems in plants where the installation of

overhead or track-type charging machines is not justified. Combination tongs and box charges are made in capacities ranging from 2,000 to 20,000 lbs. for charging melting furnaces with a wide variety of scrap. This machine is said to require no tracks or runways and, hence, is not restricted to any definite path so long as a level floor is available on which to operate. The tongs heads of the machine is equipped with an engaging head so that a box may be used in charging loose scrap. When charging baled scrap or pieces, the box is laid aside and the tongs used.

## DRUM AND BARREL TRUCK

**NP134**—Incorporating a cradle frame and rocker-design pickup prongs, this new drum and barrel truck enables one man to transport heavy drums or barrels. It is known as the "Drum Major" and is made by Towsley Trucks, Inc. Rocker pick-up and wheels operate in the same arc, so that transition from loading to wheeling position is in one rocker motion. The truck

is balanced and the wheels are equipped with roller bearings, the company states. Wheels are 10" x 2½" and can be furnished either semi-steel or molded-on rubber tread. Handle length of truck is 65"; overall width, 25"; weight, 80 lbs.

## LIGHTWEIGHT, ELECTRIC PLANTS

**NP135**—A 5000-watt electric plant weighing only 272 pounds, has been announced by D. W. Onan & Sons, Inc. This model is one of a new, improved group of plants employing the Onan "CK" air-cooled, 4 cycle, two-cylinder gasoline engine as a prime mover. These units, designed for heavy-duty service, were developed to meet needs for light-weight high capacity independent sources of electric power. The new plants will produce about 1-kilowatt hour of electricity per quart of gasoline. Compact design and light-weight, aluminum construction make all manual starting models, in either a. c. or d. c. types, easy to carry and handle on the



PLACING LOAD ON GATE



GATE LIFTS LOAD



IN OR OUT OF TRUCK—EASILY

## Cut "Delivery" Time and Costs with Anthony LIFT GATE

Here is a rugged, proved piece of truck equipment that unquestionably cuts delivery costs, earning additional profit from your truck. It will improve your service to old customers, help you get new customers, and assist you materially to "beat your competition".

With an Anthony "Lift Gate" to load and unload your trucks you get these many profitable advantages:

- A "Lift Gate" is like an extra helper.

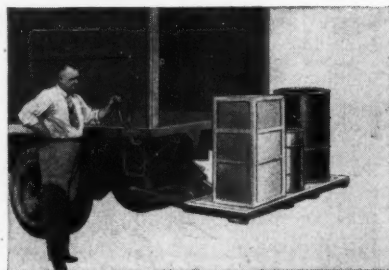
- The "Lift Gate" is like free cargo insurance.
- The "Lift Gate" improves customer relations.
- The "Lift Gate" is "free advertising."
- The "Lift Gate" is a safeguard against personnel accidents.
- The "Lift Gate" makes more deliveries per day possible.
- The "Lift Gate" is worth many times more than it costs.

The "Lift Gate" eliminates the necessity of having your drivers be "weight lifters" and "jugglers".

Anthony Hydraulic "Lift Gates" are being used by hundreds of businesses and industries to modernize delivery services. They save a tremendous amount of time, money and

hard work. The cost is surprisingly low. Many present users report savings that more than pay for their "Lift Gate" every few months. Let us send you complete information. Available for immediate installation.

**ANTHONY CO.**  
Dept. F                      Streator, Ill.

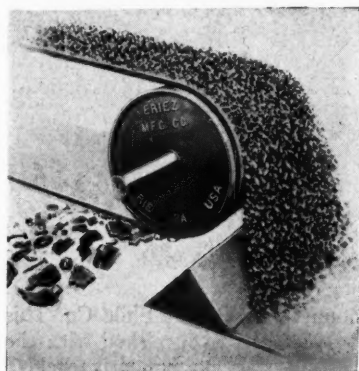




job, the company claims. Standard models includes a protective guard-equipment for the manual starting frame and convenient 4-receptacle outlet box for direct plug-in of loads, according to the release.

#### NON-ELECTRIC MAGNETIC PULLEY

**NP136**—A completely self-energized magnetic pulley requiring no electric current to generate a magnetic field is now being commercially produced by Eriez Manufacturing Co. This pulley is adaptable to



all conveyor applications requiring automatic separation of magnetic from non-magnetic materials or removal of tramp iron from coal, ores, grains, textile fibres, chemicals, foundry sand. The unit will work effectively through belts of rubber, canvas, leather or any other non-magnetic material. The unit is powered by alloy magnets. Since moisture, heat or cold will not affect its operating efficiency, it may be installed outdoors, deep in a mine or at any point where direct current is not available, states the release.

#### HEAVY DUTY LIFT TRUCK

**NP137**—A heavy-duty lift truck embodying a radically different design is now in production at Mixer-Mobile Manufacturers. The main feature of this new type lift truck is the hydraulic lift that will handle 6000 pounds to a height of eight feet, or 4000 pounds to eleven feet, yet collapse completely into the truck body like the bellows of a camera. With the lift in lowered position the equipment can pass under low head obstructions.

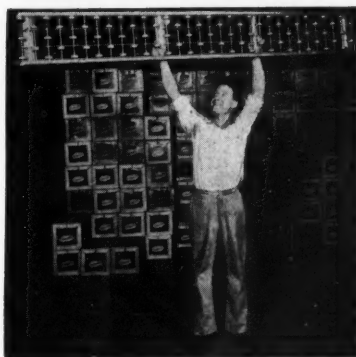
The new machine is said to work inside freight cars or in other narrow, tight quarters. A variety of quick-change attachments is available for the handling of a wide variety of heavy or bulky materials. Attachments include forks to handle pallets and lumber. "Scoop" type buckets in both 1/2 yard and 3/4 yard capacities for grain, sand, gravel, dirt and sawdust, sheet steel, pipe, castings, and other heavy, odd-shaped loads can be handled with the boom attachment.



row, tight quarters. A variety of quick-change attachments is available for the handling of a wide variety of heavy or bulky materials. Attachments include forks to handle pallets and lumber. "Scoop" type buckets in both 1/2 yard and 3/4 yard capacities for grain, sand, gravel, dirt and sawdust, sheet steel, pipe, castings, and other heavy, odd-shaped loads can be handled with the boom attachment.

#### GRAVITY CONVEYOR

**NP138**—A light-weight aluminum gravity wheel-type conveyor, especially designed to increase the port-



ability and versatility of conveyor installations and to provide an easy-to-handle type of conveyor for general use, is announced by The Rapids-Standard Company, Inc. The new conveyor will be manufactured in 5, 6, 8, and 10-foot lengths in one width of 12 inches.

## CASTERS!



Semi-steel castings with light-alloy, rubber-tired or metal wheels... Swivel assembly has double-ball race... Grease gun fitting on both swivel and wheel... 4", 6" or 8" wheels available.

**HUTTON WHEEL CORP.**

2122 WALNUT ST. • ST. LOUIS 3, MO.

**PALLETS**  
OF  
**FINEST QUALITY  
SOUTHERN  
HARDWOODS**  
—  
**PROMPT DELIVERY  
ON ANY SIZE  
ORDER!**

● Be sure to get our quotation before placing your next pallet order. We can now furnish pallets constructed from "seasoned lumber" at prices no greater than those formerly charged for green lumber. Write or wire your requirements.

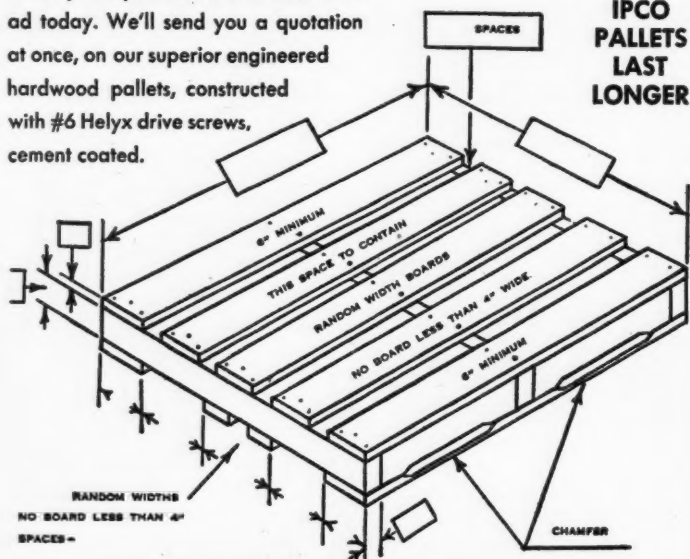
**REPRESENTATIVES WANTED**  
Write for attractive sales proposition.

**PORT BARRE**

LUMBER INDUSTRIES, INC.  
Port Barre • Louisiana

## LET US QUOTE ON YOUR PALLET NEEDS

Fill in your specifications and mail this ad today. We'll send you a quotation at once, on our superior engineered hardwood pallets, constructed with #6 Helyx drive screws, cement coated.



**IPCO  
PALLET  
LAST  
LONGER**

The IPCO representative is a materials-handling engineer. Consult him on your palletization problems . . . no obligation!



**INDUSTRIAL PALLET CO., INC.**

PALLETS EXCLUSIVELY SINCE 1941

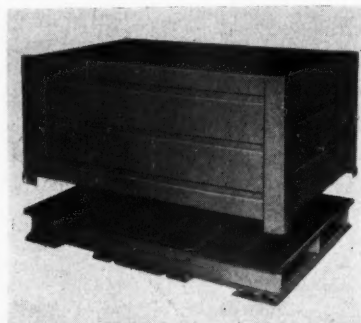
1616 WOOLWORTH BLDG., NEW YORK 7, N. Y.

Telephone BR 446 7

An eight-foot section of the new conveyor weighs only 31½ pounds, according to the release. Standard self-locking hook and bar couplers permit ready coupling of the new aluminum equipment with models of other types. The hook end coupler is fabricated of steel to withstand abuse.

### ALL-METAL PALLET

**NP139**—An all-metal pallet with nesting ring, for use either with power truck or hand truck, is an-



nounced by Palmer-Shile Co. This product can be furnished with the nesting ring permanently welded

*Is your Materials Handling*

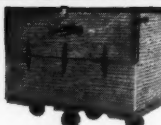
**ACCIDENTAL or  
ENGINEERED ?**



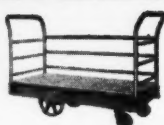
**Dolly & Flat Trucks  
Low Platforms**



**Two Wheel Trucks**



**Box and Four  
Sided Trucks**



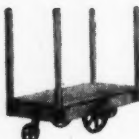
**Three Sided  
Superstructure**



**Shelf Trucks**



**Non-Tilting  
Platform Trucks**



**Balance Type  
Stake Trucks**



**Balance Type  
Rack Trucks**



**Wagon Type  
Trucks**



**Trailer Trucks**



**Truck Casters and  
Parts**



**Rubber Tired and  
Metal Wheels**

*Nutting*

**Makes over 1000 Standard and Special  
Truck Designs for Every Purpose**

In many businesses, the handling of materials has grown on a "hap-hazard" basis, as the business has grown. If this is true in your case, you will be surprised at how much your whole production program can be speeded up—and your handling costs reduced—by a properly engineered materials handling system and selection of trucks exactly suited to each type of work. More than 1,000 truck designs have been developed in the Nutting line because they were needed.

**CALL IN A NUTTING SALES ENGINEER**—let him, backed by the Nutting factory, help you select the right truck for each job. Consult the classified section of your phone directory, or write us direct.

**NUTTING TRUCK & CASTER COMPANY**

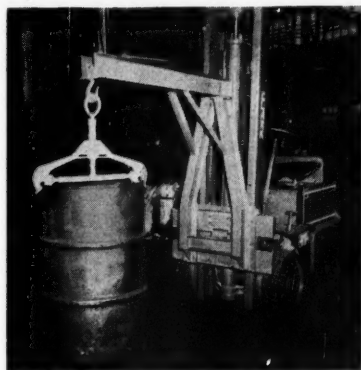
1601 DIVISION STREET WEST, FARIBAULT, MINNESOTA



to the pallet, if specified. These pallets are of special corrugated rolled steel, with all-welded construction, are built with beveled edges to allow hand truck wheels to ride over easily, and have a center channel support, states the company. The standard pallets are of various types and sizes, including a single-face pallet rack with stacking corners for handling irregular pieces; and a double-faced, two-way pallet for power fork truck only.

#### DRUM HANDLING DEVICE

**NP140**—For safe handling of drums which must be moved singly or in an upright position to prevent spilling, Clark Tractor, Division of Clark Equipment Company, has recently perfected a new clamping device which is said to be easily adapted to any Clark fork truck models. According to the company, the clamp is self-adjusting for diameters 21½" to 24" and employs a star cam permitting the operator to release the drum without dismounting. Clamping over the chime, the device grips securely throughout transportation and carries up to 700 lbs. The new clamp, it is claimed, may



also be used on fork trucks equipped with crane, swinging boom or special fork extension attachments.

#### CHAIN CONVEYOR

**NP141**—A chain conveyor that holds promise of utility value for the dairy, bottling, canning, preserving and food industry is being placed on the market by the Island Equipment Company. This type of

*The Choice of those who compare*

**MOTO-TRUC**  
*Originators of*  
**MOTORIZED**  
*hand*  
**LIFT TRUCKS**

*Pallet, Platform, Hi-Lift and Telescopic Hi-Lift types*

**WRITE FOR NEW BULLETIN**

**The MOTO-TRUC Co.**  
1953 E. 59th Street  
Cleveland 3, Ohio  
*Representatives in All Principal Cities*

A few exclusive features of Moto-Truc 12-volt Pallet Truck:

- Up to 11" shorter turning radius, due to compact power unit.
- All controls mounted in handle—two speeds forward and two reverse by a twist of the wrist on easy grip roller type handle. Push buttons in ends of handle for lifting and lowering.
- Spring return handle with safety dead man control.
- Lower line of gravity for stability.
- Nydegger rear load wheels for operation over uneven surfaces, optional.

## INDUSTRIAL TRUCKING FLOORS

*Resurfaced to withstand any traffic...*



### with CAMP'S No. 7 INDUSTRIAL FLOOR RESURFACER

**Tougher than Steel—Easy to Apply**

**COSTS ONLY \$15.00 PER 100 SQUARE FEET**

Camp's No. 7 is applied like cement over your present wood or concrete floors. A ¼ inch thickness resurfaces worn or rough concrete floors to withstand any traffic. Sets in three or four hours—ready for heavy trucking in 24 to 48 hours. Camp's No. 7 comes ready to mix—nothing else needed. Your choice of brown, red and natural dark gray.

Order a trial unit—you must agree it is the best resurfacer you have seen, or there will be no charge.

**EVERY INSTALLATION UNCONDITIONALLY GUARANTEED**

Further information describing this and other Camp's flooring material sent on request.

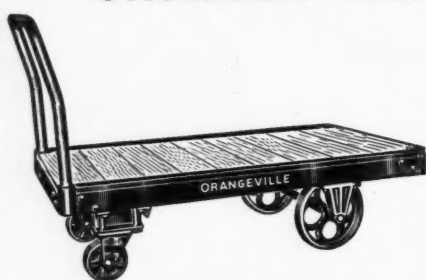
**The CAMP COMPANY**  
6958 S. State St., Chicago 21, Ill., Triangle 4770





# FLOOR TRUCKS

## STANDARD AND SPECIAL



WHEELS: Metal - Rubber - Pneumatic



## SPECIALS OUR SPECIALTY



We take pride in our product and guarantee satisfactory performance and sturdy, long time operation under the most severe use. Agencies in most principal cities. Catalog gladly furnished upon request. Repeat orders testify to the efficiency of our trucks.

MAIN OFFICE AND FACTORY

**ORANGEVILLE MFG. CO.**

"Established 1879"

ORANGEVILLE 1, PENNA.



conveyor is said to have specially designed links in order to obtain a broad, flat carrying surface. A special pin makes assembling or disconnecting of the chain an easy job, according to the company. Adjustment for tightening or loosening the chain is provided at the end of each unit. Variations can be supplied and used in conjunction with this system.

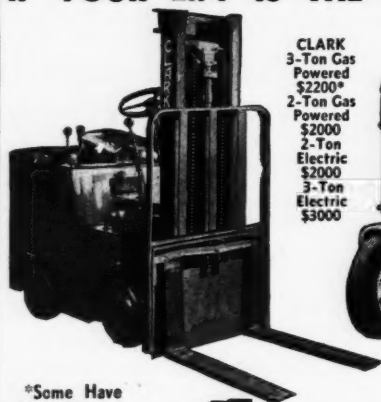
### CLAMP ARM ATTACHMENT

NP142—A clamp arm accessory for fork lift trucks which, it is

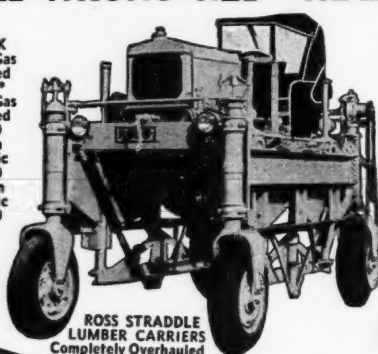


claimed, prevents shifting or slipping of large, "flat" loads while being transported or stacked, has been developed by the Towmotor

## IF YOUR LIFT IS THE WRONG SIZE — TRADE FOR ONE OF THESE



**CLARK**  
3-Ton Gas  
Powered  
\$2200\*  
2-Ton Gas  
Powered  
\$2000  
2-Ton  
Electric  
\$2000  
3-Ton  
Electric  
\$3000

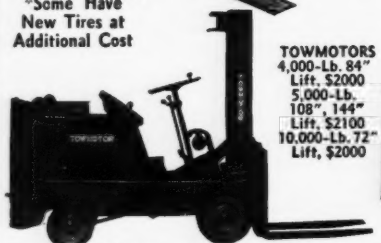


**ROSS STRADDLE  
LUMBER CARRIERS**  
Completely Overhauled  
All Essential Parts  
Replaced  
7½-Ton \$3750  
12-Ton \$5500



**BAKER**  
60" Hydraulic  
Lift Platform  
\$2150  
**YALE &  
AUTOMATIC**  
60" Lift Platform  
\$1950  
4,000-Lb. Low  
Lift Platform  
\$1950  
**ELWELL-PARKER**  
10,000-Lb.  
60" Platform  
Lift with  
Ready-Power  
\$4200

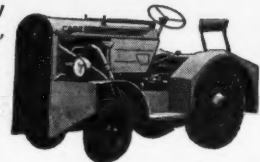
\*Some Have  
New Tires at  
Additional Cost



**TOWMOTOR**  
4,000-Lb. 84"  
Lift, \$2000  
5,000-Lb.  
108", 144"  
Lift, \$2100  
10,000-Lb. 72"  
Lift, \$2000



**BRAND NEW  
ROSS**  
6,000-Lb. 10'  
Lift, \$5200  
10,000-Lb.  
16' Lift,  
\$5750  
(Both With  
Dual  
Pneumatic  
Tires)



**GASOLINE  
& ELECTRIC  
POWERED  
TRACTORS**  
Solid &  
Pneumatic  
Tires

TERMS IF DESIRED — \$42.50 — \$1000 — 1 YEAR

**DO YOU HAVE PROBLEMS IN YOUR WAREHOUSE?  
LET US SOLVE THEM**

We have graduate engineers with years of Army and Civilian experience in material handling and warehousing  
**YOU CAN ALSO RENT THIS EQUIPMENT BY THE DAY, WEEK OR MONTH, USING YOUR OWN OPERATORS.**

**ALL VEHICLES RECONDI-  
TIONED AND SOLD WITH  
NEW TRUCK GUARANTEE**

## HARRY M. RIGHTER, Inc.

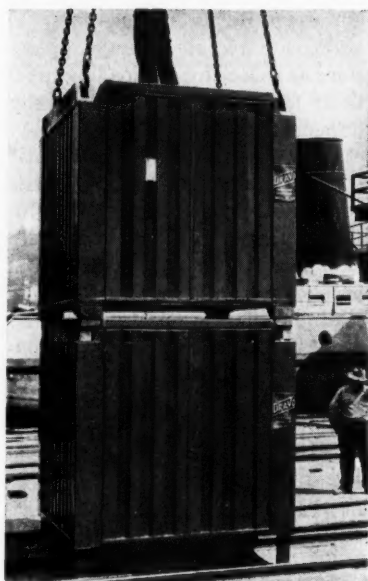
PHONE AT lantic 1631 Cleveland, O. 7:30 a.m. to 4:00 p.m.  
Foot of W. 45th St.—Former American Shipbuilding Yard—First turn  
toward lake west of High Bridge off Bulkley Blvd. 5 minutes from  
Square. OWNED, OPERATED AND MANNED BY VETERANS OF  
WORLD WAR II.



Corp. The accessory was originally designed for handling loads of barrel staves for a large cooperage company. The attachment consists of a set of clamp arms which are hydraulically operated to grip the load. The action is controlled by means of a valve adjacent to the operator. Both arms are equipped with a layer of sponge rubber along the bottom edge, which assures a positive, firm grip without the possibility of marring or otherwise damaging the materials being handled. Loads up to 4,000 pounds are lifted to the full 114 inches of lift provided on the unit. Used in its "standard" form or with special adaptations such as a curved arm for cylindrical loads, the attachment offers many time-saving advantages in a wide variety of industries, the company states.

### WELDED STEEL SHIPPING CONTAINER

**NP143**—Said to be relatively new in the marine field, a 277-cubic-foot welded steel, interlocking shipping container has been developed by



the Dravo Corporation. Designed to carry loads up to 12,000 pounds, the container is claimed to be weathertight. Dimensions of the standard size are; 7' 9" long, 6' 5" wide, and 6' 10" high. Weight, empty, is 1650 pounds. Hinged

## Here's the towing unit of the BUDA MATERIAL HANDLING FLEET



**BUDA Chore Boy Model B**... 1/2 ton capacity, 3 wheels. Also available with dual rear wheels, 1 ton capacity. (Model HB)



**BUDA Chore Boy Model FF**... 1 ton capacity, heavier throughout, 60% more loading space, dual rear wheels.



**BUDA Chore Boy Model B or HB**, with special dump hopper for bulk materials. 1/2 or 1 ton capacity.



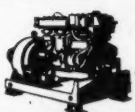
**BUDA Chore Boy TRACTOR Model TR**, for trailer hauling, same basic design—85% of parts interchangeable with other Chore Boy Models.



**BUDA Chore Boy REFUELER**, for aircraft servicing—carries and pumps 250 gals. of gasoline or lubricating oil.



**BUDA Lifting Jacks**. Wide range of sizes, in both hydraulic and mechanical models, capacities to 75 tons.



**BUDA Diesel—Gasoline**—Natural Gas—Butane—Propane Engines, Power Units from 5 to 340 H. P. Diesel-Electric Generator Sets from 2 1/2 to 125 K.W.

## ...the Chore Boy TRACTOR

BUDA now offers the latest addition to its complete Fleet of Industrial Trucks...the Chore Boy TRACTOR, engineered for fast, low-cost towing in and around factories—freight terminals—warehouses—shops... wherever materials must be handled. Here are some of the new TRACTOR'S features:

- 4-cycle air-cooled gasoline engine
- Speeds up to 10 m. p. h.
- Pulls 5 or 6 trailers, each carrying 2000 pounds
- Welded all-steel frame and body
- Standard foot brake, plus automatic safety brake
- 4 speeds forward—4 speeds reverse

Get the complete story about the new TRACTOR or other BUDA Chore Boy Models right now. Write for literature.

# BUDA

15454 Commercial Avenue  
HARVEY (Chicago Suburb) ILLINOIS

## CRANE USERS "REPEAT ORDER" on EUCLIDS

Efficient operation with a minimum of repairs over long periods makes it seem wisdom to old users that each new crane requirement be filled with a similar dependable "Euclid" crane.

You will doubtless desire

a copy of the new Euclid Crane Catalog now in process of compilation. Just drop us a line and we'll be glad to forward your copy when it is ready.

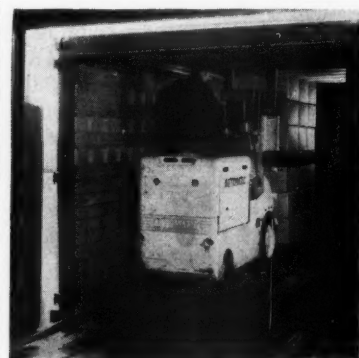
**THE EUCLID CRANE & HOIST COMPANY**  
1362 CHARDON ROAD, EUCLID, OHIO



legs permit handling by either platform or fork truck.

### FORK TRUCK

**NP144**—A fork truck to meet the needs of shippers, manufacturers and carriers using motor trucks and trailers has been added to the line of the Automatic Transportation Co. The truck is said to be



capable of tiering to truck and trailer ceilings as low as 68 inches and have a total lift of 100 inches. It is available in 2000, 3000 and 4000 pound capacities. The 100-inch telescopic lift is said to be an additional advantage, making the truck suitable for storage operations as well as for the loading functions for which it was primarily designed.

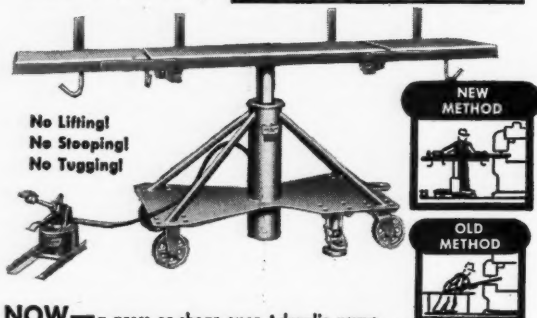
A new feature, the pneumatic controller, operates as the electric counterpart of an automobile automatic gearshift. This is said to eliminate tire slippage, enable even acceleration, and reduce the peak load on the electrical system by two-thirds. The controls, including the two foot pedals, steering wheel and two levers, are also closely similar to those of an automobile. Brake pedal and foot accelerator are both identical to those of a car.

### HAND HOIST

**NP145**—The Chisolm-Moore Hoist Corporation manufactures a line of high-speed hand-operated hoists that are made of steel and aluminum alloys. The company claims that the weight of the hoists has been reduced to a point where they are nearly 45 per cent lighter. All

## SAVE HANDLING

by **LYON-Raymond Hydraulic Sheet & Strip FEEDING TABLES**



**NOW**—a press or shear operator can keep a diminishing stock of material constantly at the perfect feeding level.

✓ No need to lift, or stoop, or tug, or haul. He just slides each sheet or strip into position easily, quickly, safely.

✓ Doesn't have to leave his position! A pedal-operated hy-

draulic pump — located wherever convenient to the operator — elevates the table as the feeding operation requires.

✓ Models of 2,000, 4,000, 6,000 and 10,000 lb. capacities, non-tilting (for horizontal bed presses) or adjustable tilting top (for inclined presses). Various standard size table tops.

EXHIBITING AT MATERIALS HANDLING EXPOSITION

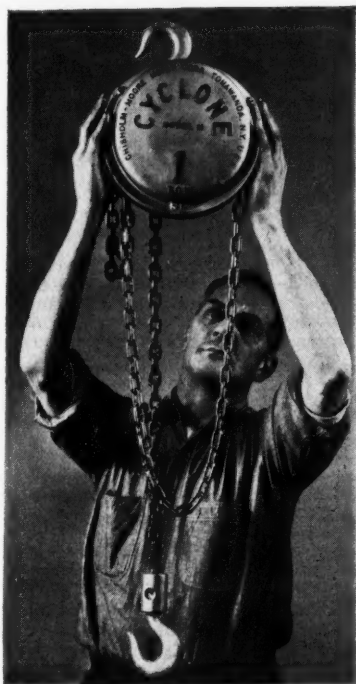
➔ **WRITE**—Here's money-saving information on this shop-proved LYON-Raymond sheet feeding table. Folder sent free, without obligation, on your request.

**LYON-Raymond Corporation**

630 Madison St.

Greene, N. Y.

rotating parts are fitted with precision ball bearings that have double sealed-in lifetime lubrication. The release states that improvements have been made in the lift wheel, load chain guide, gearing and load brake, minimizing the pull required by the operator to lower loads. Known as the Cy-



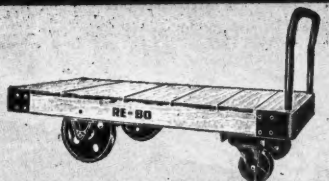
clone Model M, the hoist is available in four standard capacities:  $\frac{1}{4}$  ton,  $\frac{1}{2}$  ton, 1 ton and 2 tons. All models are equipped with steel chains.

#### POWER DRIVEN DUMBWAITERS

**NP146**—A complete new line of power-driven dumbwaiters is now in production at the Sage Equipment Company. Featuring a standard unit with a lifting capacity of 500 lbs., Cutler-Hammer controls and all-welded steel construction, the dumbwaiter is the newest addition to the company's line of material handling equipment. A wire-rope drive provides a lifting speed of 40 feet per minute for the 3' x 3' platform. An adjustable device is provided for the top sprocket. Wall brackets and rails are included as standard equipment. Special capacities and heights are built to individual specifications.

Don't be late. The FLOW contest closes December 15. See page 12.

## PLATFORM TRUCKS



Made in a number of designs for general utility in handling all sorts of merchandise in warehouses, terminals, factories, or shipping rooms. Each design available in several capacities and sizes. Rugged and solidly built. Engineered for easy maneuvering. Rubber or semi-steel wheels.

#### QUICK DELIVERIES

Send for Bulletin No. 33



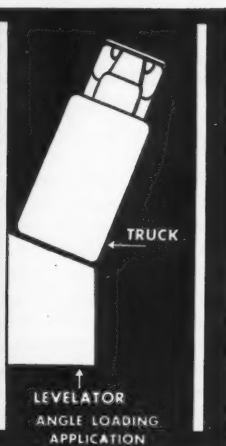
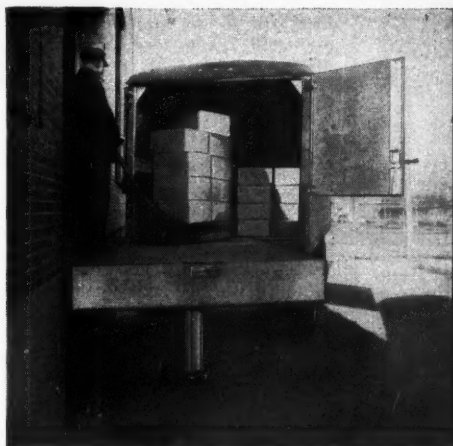
Plant—Bedford, Va.



## The "LITTLE HUSTLER" TRANSFERS STAMPINGS AS FAST AS PRODUCED!

The "Little Hustler" is fully portable and quickly adjustable to a wide range of applications. The 8 foot size shown above has a maximum delivery height of 81 inches at 45° and 50 inches in a horizontal position. Made in 13 models: 4-6-8-10 and 12 ft. long, by 12", 18" or 24" wide. Also special sizes. Send for circular LHC. We design and manufacture permanent conveyor systems and all types of SPECIAL EQUIPMENT.

**MAY-IRAN**  
ENGINEERING, INC.  
Development Engineering and Manufacturing  
1710 Clarkstone Rd. Cleveland 7, Ohio



## NOW YOU CAN LOAD AT TRUCK-BED HEIGHT

The above shows Levelator Lifts being used to load and unload trucks in a narrow alley without loading docks. This is just one of the many ways they can handle materials faster, cheaper . . . with less manpower. Powerful hydraulic jack raises or lowers heaviest loads directly from plant floor to trucks, freight cars or different building levels. Safe, dependable, economical. Installation simple and inexpensive.

ROTARY LIFT CO., 1058 Kansas, Memphis 2, Tenn.



For complete data request Catalog 201



\*Reg. U. S. Pat. Ofc.



# HALLOWELL TRUCKS of STEEL

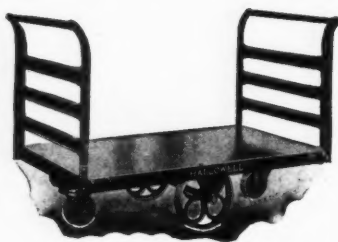
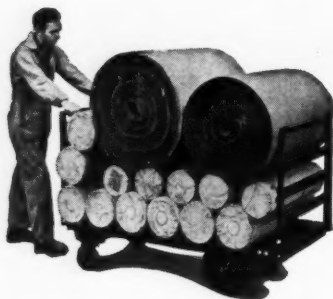


Fig. 754  
Pat. applied for

... EACH OF STURDY  
WELDED CONSTRUCTION



Yes, welded steel construction—smooth and splinter-proof—that insures against weak, loose joints and wobbly trucks . . . and their free-rolling wheels and casters run easily even under heavy loads. Each type and style a model of smooth-running durability—is available for every service . . . and is built to stand years of gruelling, splinter-proof punishment with minimum maintenance and repair. Write for your copy of the "Hallowell" Catalog, it describes them all.



Fig. 757  
2-Bar Handles



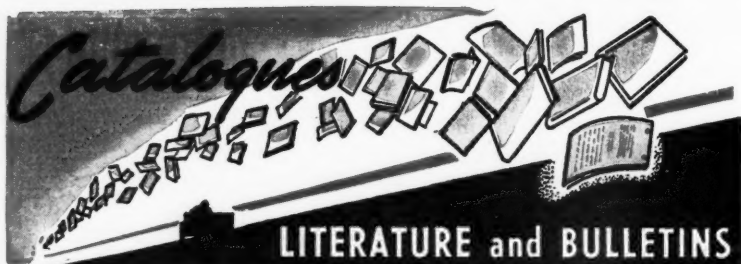
Fig. 753  
4-Wooden Stakes

"Unbrako" and "Hallowell" Products are sold entirely through Industrial Distributors.

OVER 44 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

JENKINTOWN, PA. Box 250  
BOSTON CHICAGO DETROIT  
INDIANAPOLIS ST. LOUIS SAN FRANCISCO



## LITERATURE and BULLETINS

The publications featured on these pages were written by experts. They are FREE publications. To obtain these use the postcard bound into this issue.

**371—Electric Trucks . . .** "Looking beyond the price tag" is the title of a new booklet published by the Electric Industrial Truck Association. The publication lists advantages of the equipment and is illustrated with cartoons. Members of the association in the truck, battery and charging equipment fields are shown on the back cover.

**372—Portable Conveyors . . .** Both flat and trough belt portable conveyors are described in two booklets released by the Trowbridge Conveyor Co. Spec-

ification charts and photographs are shown on some 18 models. The trough belt conveyors are pictured moving such materials as sand, gravel, crushed stone and abrasives. Flat belt types are used in handling coal, coke and other non-abrasive materials. The folders are punched for insertion in three ring binders.

**373—Speed Drives . . .** Reliance Electric and Engineering Company has issued a bulletin covering adjustable speed drives in higher horsepower rat-

# OPPORTUNITIES

Men wanted Jobs wanted Lines available

Rates: for "Positions Wanted" \$3.50 minimum, limit 25 words. For all other classifications \$3.50 minimum for 25 words, each additional word 10c; bold-face type or all capitals, \$6.00 minimum for 25 words, each additional word 15c; limit 50 words. Box addresses count as five words. All insertions are payable in advance.

## FOR SALE

We will make attractive prices, f.o.b. Cleveland, on the following excess material-handling equipment: one 26½" x 34" Upender Scoop for Towmotor, with full apron and blades to handle newspaper rolls or similar merchandise 36" to 39" in diameter; one Shaw Box Crane, half-ton capacity with 220 V. AC motor; one 18" flat Belt Conveyor, 65' long, with 5-ply rubber-and-canvas belt, driven by 3 h.p. motor. Shopping News, 5309 Hamilton Ave., Cleveland 14, Ohio.

For Sale, Salisbury Turreteer Truck for handling skids; 4000 lbs. capacity; platform 24" wide, 48" long, 9" lowered height, 3½" lift. Practically new, and good condition. For information and illustration, Box 1047, Flow.

## MISCELLANEOUS

"Freight Bills audited by expert. Have collected large claims on skids, trucks, etc. Commission basis. A. J. Hemphill, 318 Linden Ave., Montclair, N. J."

WANTED IMMEDIATELY  
FORK LIFT TRUCKS  
GAS OR ELECTRIC  
HIGH PRICES PAID

A & A MACHINERY CORP.  
1267 Flushing Ave., Bklyn., EV 7-9466

## DISTRIBUTORS WANTED

Nationally known conveyor manufacturer has the following territories open for aggressive jobbing distributors with facilities for stocking and experienced material handling engineer. All New England States except Connecticut. Western New York and Pennsylvania. Southern Indiana, Washington, Oregon, Virginia, North and South Carolina and Western Texas. Interested parties should outline in detail their qualifications. Box No. 2047, FLOW.

Old established manufacturer of Powered Industrial Shop Trucks is changing distribution and merchandising policies and wants active distributors in various sections of the United States and Canada. Excellent commission with protected territory and unusual factory sales help. Box No. 3047. FLOW.

## REPRESENTATIVES WANTED

### AGENTS WANTED FOR STAIR-LIFT

Replaces existing stairway. Conveys materials on lower landing which rides on channel sides to next floor. Equipped with highest quality rollers. Complete safety devices-foolproof. Numerous installations. All users enthusiastic. Selling price under \$1000. Write for full information and our profitable sales proposition.

### FIRESTONE STAIR-LIFT

1706 N. Pascal St. St. Paul 8, Minn.

FLOW



ings. Various applications of these units are discussed. The bulletin also describes the equipment involved for operation from A.C., 2-phase 60 cycle, 220, 440 or 550-volt circuits.

**374—Car Shakeout . . .** The Robins Conveyors Division of Hewit-Robins Inc. has issued a new bulletin completely describing and illustrating the Robins Car Shakeout. It presents reports from users regarding savings made in unloading such materials as coal, petroleum coke, limestone, ore and other bulk materials, even when they are frozen. Two pages are devoted to the handling of this equipment by hoist, with a spread of photographs showing rigs.

**375—Pallets, Bins and Racks . . .** How to achieve complete coordination of all steps in materials handling at relatively low cost—the subject of a new booklet on "The Turner System of Material Handling", by Factory Service Company. Descriptive pages on the Turner System show how this method has saved up to 50 per cent in costs, floor space and equipment cost for many concerns. Specially designed units for the most efficient operation of the system are also illustrated. Among subjects covered in the book are the concentration of materials within easy reach of operators, vertical and horizontal expansion, practical stacking and storing, the elimination of waste motion in handling, and the use of movable transports, bin sections, die and shelf racks, pallets, shop boxes, trays, etc. The systematic movement of products or parts through the plant and a series of interlocking units of almost unlimited flexibility are explained in other sections of the book.

**376—Cranes . . .** A 24-page catalog by the Euclid Crane and Hoist Co., has been released. Such subjects as bridge girders, trolley details, trolleys, and typical indoor and outdoor cranes are amply illustrated and discussed in the text. Cranes with auxiliary hoists, floor controlled models, and special installations are shown. A chart shows the capacities and dimensions of standard models.

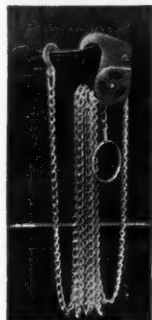
**377—Flooring . . .** A series of folders covering many types of industrial flooring material has been prepared by The Camp Company. Booklets treat such subjects as resurfacing, patching, and laying of new floors over cement, wood or steel surfaces. Lists of the users in all fields of industry are also shown.

**378—Loading Ramp . . .** Lightweight, magnesium loading ramps built to individual specifications are discussed in a four-page brochure by the Magnesium Company of America. One page is designed as a questionnaire to be filled out by the user. The purpose is to select the proper type of ramp for each specific requirement.

**379—Woven Wood and Wire Containers . . .** Skid boxes, shipping containers, stacking boxes and box trucks are the subject of a booklet by the G. B. Lewis Company. Discussed are the handling of small parts such as stampings, castings, raw material and assemblies from one manufacturing process to another, into temporary storage; and from one department or factory to another, or from parts-producing machine to assembly lines.

## WORLD'S EASIEST WAY TO OPEN ANY BOX CAR DOOR

### MONARCH ONE MAN CAR DOOR OPENER



ONLY \$22.50 EACH  
F.O.B. Bowerston

One man can open the most binding, balky box car door with the Monarch Car Door Opener. Get greater safety . . . speed loading and unloading schedules . . . order an ample supply to fill your needs today!

• No strained muscles. No slips or falls. No broken arms, legs or mashed fingers. No fatalities. No time wasted. No "gangs" needed. No time loss.

Write for free descriptive literature.

### The Nolan Company

Dept F, Bowerston, O.



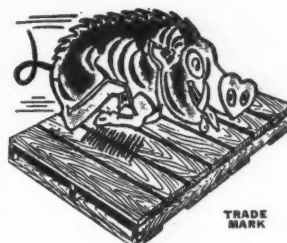
### THE BALANCED DRIVE HANSEN TACKERS

IT'S no trick with Hansen, with its *Balanced Drive*, to tack more labels or tags or line more boxes, in less time, with minimum effort, and keep shipments on the go.

Faster and safer than hammer and tacks—neater than glue with its goo—Hansen quickly and securely labels shipments, for neat appearance and safe arrival.

Alike in shipping, assembly or production, the zip-zip action of the Hansen Tacker, light weight and easy portability, speed up all kinds of jobs that require tacking or fastening.

ASK FOR FOLDER  
**A. L. HANSEN MFG. CO.**  
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### PALLETS TO FIT YOUR NEEDS . . .

We didn't build a better mouse trap, but the old adage holds true with our pallets. We are getting new customers everyday and more and more repeat orders from old customers. Razorback pallets are made with Dry Southern Hardwood Deckboards. Drilled before insertion of drive screws to prevent excessive splitting.

Write For Our New Descriptive Folder

### ARKANSAS PALLET CORP.

Plant in Pine Bluff, Ark.  
Sales Office: Box 153-A, Pulaski Hgts.  
Sta., Little Rock, Ark. Phone 3-9133.

### THOMAS TRUCK of Keokuk PRY TRUCKS

Easy, Fast, Safe For Big Loads

Loads of freight too big or too heavy for regular 2-wheel trucks can be handled easily with Thomas Pry Trucks, particularly when used in pairs. Sharp steel nose slides under load, tremendous leverage enables user to easily raise load as high as 9' from floor. Used by freight handler on R.R., trucks, docks and in mfg. plants. One of many Thomas 2 and 4 wheel trucks. Write for bulletin P.T.

THOMAS TRUCK & CASTER CO.  
4701 Mississippi River, Keokuk, Ia.

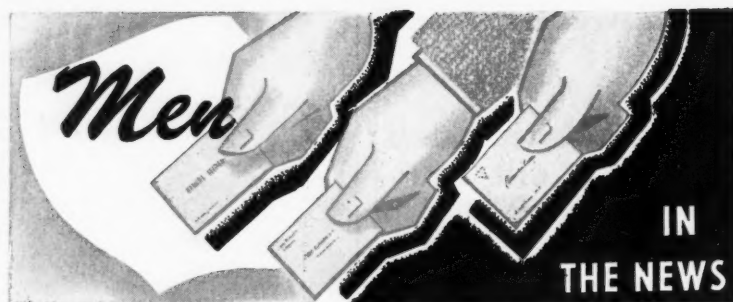
### THOMAS One Man BARREL TRUCK

No Rocking—No Lifting

Easy for one man to handle up to 1000 lb. barrels, drums, quickly, safely. Simply engage sliding hook in rim of barrel, pull handles slightly—hold with foot. That's all! Loads, unloads automatically. Trucker never touches barrel. Load balanced perfectly. No arm strain. Welded steel, rubber tires, Hyatt bearings. Low priced. Try one. Return collect if not "best yet"

THOMAS TRUCK & CASTER CO.  
4701 Mississippi River, Keokuk, Ia.





**JACK BURTON**, Vice President and General Manager of Diagraph-Bradley Industries, Inc., announced the appointment of O. K. Patterson as Sales Manager of the Shipping Room Supply Division with headquarters in St. Louis. Patterson was formerly in charge of the Eastern Division, working out of New York City.



**J. M. JOHNSON**, a veteran of nearly twenty years in the electric truck field, has been appointed assistant sales manager of Automatic Transportation Company, Chicago. Formerly in charge of sales for Automatic's transporter Division, Johnson will now assist in both the Transporter and Truck divisions. His new post combines his previous position with that formerly filled by J. A. Baldinger, who was recently named assistant to the general manager after serving as assistant sales manager for the Truck Division.



**TWO** new personnel additions have recently been made by the Mobilift Corporation, manufacturers of Mobilift fork lift truck used in warehouses and factories. As a result of the West Coast's increased industrial demands, a new San Francisco office has been opened with R. M. Lewis as man-

ager. Lewis previously sold for the Star Machinery Company of Seattle, Washington. In Mobilift's Atlanta, Georgia office, T. H. Skeel is replacing former manager E. J. Sell. Before joining the organization in 1945 as a salesman in the Richmond territory, Skeel was affiliated with other industrial firms and served with Bell Aircraft during the war.

Previously known as the General Equipment Company, Mobilift's manufacturers are now changing their name to Mobilift Corporation. The home-office is located at 835 S. E. Main Street, Portland.

**C. F. GROSS** has been appointed Philadelphia Division Manager for the C & D Battery Co. The Philadelphia Division Organization of three salesmen and a service engineer handles the sale of the complete C & D industrial battery line for electrical industrial trucks, locomotive, Diesel, telephone, marine, air conditioning and car lighting. He is Secretary-Treasurer of the Material Handling Society of Philadelphia.



**OFFICIALS** of the British Division of The Yale & Towne Manufacturing Co. have just completed an extended visit to the United States to study American methods of manufacture and distribution which they can apply in Yale & Towne's British plant in Willenhall, England. During their nearly three-months' visit to the United States, they visited each of Yale & Towne's division as well as

other industries, studying methods of manufacture of locks and builders' hardware and materials handling machinery and equip-



ment. Left to right: H. G. Ramsell, General Works Manager of the British Division; and A. A. Simpson, General Sales Manager.

**GEORGE R. FRAUNFELDER**, formerly Chief Sales Engineer of Easton Car & Construction Company, has been appointed to the newly created office of Director of Engineering and Research, according to an announcement by the company.



Fraunfelder has been with Easton as a design engineer since 1926. For several years, his work has been concentrated on the development of heavy-duty off-highway trailers for mines, quarries and intra-plant industrial haulage.

**THE A. B. Farquhar Company** announces the establishment of a sales office in Washington, D. C., at 1009 Washington Gas Light Building, 11th & "H" Streets, N. W., Washington, 1, D. C., with Mrs. C. R. Heller in charge as the Washington representative.



Heller will represent the company in the sale of material handling conveyors, farm machinery and hydraulic presses and will confine his efforts to Governmental and Armed Service Bureaus located in Washington and Foreign Purchasing Commissions. He has many years of experience in sales, engineering, administrative and executive work.

# NEWS FROM THE <sup>Sales</sup> FIELD

**S**PURGEON COMPANY, Detroit: R. C. Neiswander, sales manager, announces the appointment of the Spurgeon Company as Michigan district representative of the Hertner Electric Company, Cleveland, manufacturer of industrial - truck battery - chargers and motor generators. Associated with J. H. Spurgeon are Earle Schlee, Lynn Beadle and Wm. McIntyre, all well known in the material handling equipment field. "This appointment marks another step in the Hertner policy of establishing representatives in key areas for better service to the electrical industrial truck field," said Neiswander.



**D**ROTT MANUFACTURING CORPORATION, Milwaukee: Drott twin-controlled tilting bulldozers and angledozers are now sold and serviced by Oliver Cletrac dealers throughout the country. In addition to Drott bulldozers and angledozers, these dealers also handle Drott Bulclam shovels and lift loaders.

**R**APIDS-STANDARD COMPANY, INC., Grand Rapids: Jerold Van Alsborg has been named Ohio sales representative. He will maintain an office at 663 Spitzer Building, in Toledo. He is a member of the American Society of Naval Engineers and the American Society of Heating and Ventilating Engineers. His long experience in industry will be directed towards promoting industrial efficiency through application of modern material handling methods and equipment.

**G**EORGE E. MILLER COMPANY, Boston: It has been appointed as the exclusive dealer-distributor in the Boston, Massachusetts - Providence, Rhode Island area by the Crescent Truck Company. The Miller Co. will handle all distribution, sales and service of Crescent electric industrial trucks and tractors in the area.

**A**LBERT H. CAYNE COMPANY, New York: It has recently been appointed as the dealer-distributor of Crescent Products in the metropolitan New York area by Crescent Truck Company for the distribution, sales and service of Crescent electric industrial trucks and tractors. The company offers the latest in service to all users of Crescent equipment.

**D**OMINION EQUIPMENT COMPANY, Montreal: It has been appointed as the exclusive dealer in Crescent products in the provinces of Ontario and Quebec by the Crescent Truck Company for the distribution, sales and service of Crescent electric industrial trucks and tractors. F. W. Simard, Sales Manager and Mr. G. Gillies, Treasurer, have had extensive experience in material handling and allied fields.

**A**ERICAN ENGINEERING COMPANY, Philadelphia: The Material Handling Division has appointed the Montgomery Equipment Company, headed by Bob Montgomery, 549 West Washington Blvd., Chicago, as Material Handling Sales Representative for the Chicago Territory. This makes two Material Handling Sales Representatives in the Chicago territory now, the other firm being Mayer & Oswald, Inc., 37 West Van Buren Street.

The American Engineering Company has opened its own Material Handling Division Office at 224 East 38th Street, New York 16, New York, under the direction of Mr. Jack L. Taylor to assist jobbers with sales of electric hoists and car pullers in the New York and Northern New Jersey Territory.

**S**T. REGIS SALES CORPORATION, Chicago: V. C. Douglas, Vice President of the St. Regis Sales Corporation, has announced the opening of a multi-wall paper bag sales office in Minneapolis to service the flour milling industry in that territory. The Minneapolis office is located at 2013 Foshay Tower, and is under the supervision of Harry A. Hughes. This office, operating within the Central Sales District, which has its headquarters in Chicago, brings to 23 the number of offices that St. Regis maintains throughout the country for the sale of heavy-duty paper bags to the rock products, food, feed, chemical, and fertilizer industries.

## CORRECTION

In last month's issue of this department we mistakenly stated that the Production Dispatch Co., Indianapolis, represented the following companies: Towmotor Corp.; Lift Trucks, Inc.; Monroe Auto Equipment Co.; M. & E. Mfg. Co.; Hopkinsville Woodcraftsmen. Instead, the statement should have been to the effect that the Production Dispatch Co., in representing these companies, is acting as sub-agent for Peter P. Wood Co., Indianapolis. The Peter P. Wood Co. is the exclusive distributor in Indiana for the products of the above-mentioned concerns, while the Production Dispatch Co. is the sub-agent for these lines in Central Indiana for the Peter P. Wood Co.

## INCLINEBELT



The Standardized Inclinebelt elevates and lowers commodities. The rough surface belt is set permanently at 28 degrees. Two belt widths are available: 14 inch for commodities up to 15½ inches wide; 24 inch for commodities up to 25½ inches wide. Both widths are made in lengths for floor to floor elevations of 8 ft. to 14 ft. 6 inches inclusive.

Furnished with or without the horizontal feed section at the bottom. Top end is curved like a gooseneck to provide horizontal feed or discharge of commodities. Size and type motor depends on local requirements and current available. Write for Bulletin FL-107.

**STANDARD CONVEYORS**  
Sales and Service in  
All Principal Cities  
STANDARD CONVEYOR COMPANY  
General Offices: North St. Paul 9, Minn.

## Why ENGINEERED DESIGN PALLETS?

The selection of the proper pallet is the most important single step in the development of a fork truck-pallet system. The correct choice of fork truck can be made only after all details of pallet size, load and weight are known.

ENGINEERED DESIGN will insure the success of your entire installation by making that most important initial step a judicious one.

*Pallets Incorporated*

Manufacturers of  
**ENGINEERED DESIGN Pallets**  
GLEN FALLS, N. Y.



Another Addition to the  
**IRONBOUND FAMILY...the**

**FLO  
TRUK**



**STURDY • VERSATILE  
ECONOMICAL**

The Ironbound FloTruk is a sturdy all-purpose unit. Along with other well-known Ironbound materials handling equipment it will be available from stock. Such inexpensive manpower conserving units can be adapted to meet particular production requirements. Ironbound engineers will be glad to analyze and discuss your materials handling problems with you. Savings up to 40% of your factory payroll can be affected thru proper application of the correct materials handling equipment. Call Ironbound today. Write for illustrated literature.

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IRONBOUND  
MATERIALS  
HANDLING  
EQUIPMENT

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MATERIALS HANDLING EQUIPMENT

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DOLLIES • FLOOR TRUCKS**

**Get the Load  
out of your Plants**



...WITH THE NEW  
**HydroLectric K**

The New HydroLectric Model K is proving its stamina and economy in the nation's leading plants.

Reports from users indicate the new trucks easily out-perform previous Lift Truck models, long considered "prime" movers in industry. With many new features, the HydroLectric "K" deserves prompt investigation. Write Dept. L for new bulletin showing mechanical details and action photos.



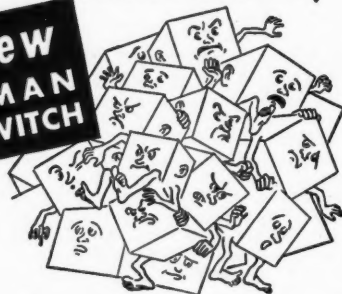
**LIFT TRUCKS, INC.**

Walter Stuebing, President

2425 Spring Grove Ave. Cincinnati 14, Ohio

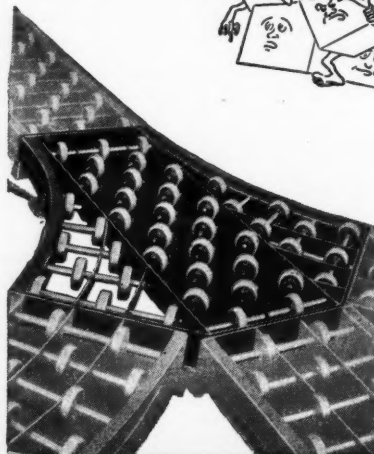
**Eliminate PACKAGE JAMS!**

**WITH New  
BUSCHMAN  
3-WAY SWITCH**



Flip the lever and the new Buschman Switch shifts packages in any of three directions . . . Switch fits any Buschman roll or wheel conveyor . . . installed in a jiffy. Write for new Bulletin.

**WINTON PL.**  
CINCINNATI 32,  
OHIO



**The E. W. BUSCHMAN Co.**



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*Immediate  
Shipment*

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SHELF BOX

"BAY" shelf boxes furnish an excellent method of storing bolts, nuts and other small parts. Straight sides allow for compact arrangement and maximum use of storage space. Because of their smooth surfaces, these boxes can be removed or shifted with very little effort. Label holder on the front of each box makes identification of contents easy, greatly speeding material handling. Handle on front only. Boxes are furnished in baked green finish.

No. 85 HL 5½" W. x 11¾" L. x 4⅝" H. .93 ea.

No. 86 HL 5½" W. x 17¾" L. x 4⅝" H. \$1.05 ea.

No. 87 HL 8¼" W. x 11¾" L. x 4⅝" H. \$1.01 ea.

No. 88 HL 8¼" W. x 17¾" L. x 4⅝" H. \$1.17 ea.

All Prices F.O.B. Philadelphia Plant

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Telephone BA ldwin 9-1805

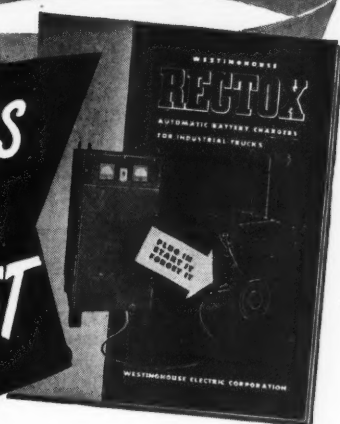


Cuts marking costs 25 to 50 percent. Prevents waste from ink evaporation and spillage. Eliminates dipping into an ink pot. Makes stenciling easy, fast, right. All-aluminum construction with leak-proof side button. One of many quality D.-B. items for better shipping. See your telephone book under "Stencil Cutting Machines" or write for complete catalog to: Diagraph-Bradley, Dept. E, 3745 Forest Park Blvd., St. Louis 8, Mo. World's oldest and largest stencil machine manufacturer.



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GET THIS  
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Save long hauls and lost time in keeping truck batteries charged and on the job! New Westinghouse Rectox rectifiers can be set down anywhere in the plant where trucks can park. No special foundations or wiring.

Rectox is the perfect solution to "bogged down" charging-room facilities. Add Rectox Chargers, till your charging capacity equals your needs—no more.

Rectox is simple to operate; needs only plugging in of the battery and turning the time switch. Rate of charge, timing, prevention by the d-c interrupter of "flow-back" or leakage from the battery through the rectifier . . . and automatic "cut-off" at the end of the charge—are all automatic with Rectox, and require no supervision or skilled operator. The Rectox is foolproof.

Get full details in Booklet B-3642. Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pa.  
J-21398-A



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PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE



RECTOX COPPER-OXIDE RECTIFIERS



**REDUCE BREAKAGE &  
INCREASE SAFETY**  
of  
**Lift Truck Operation**  
with  
**WATERMAN  
SAFETY REGULATORS**

**This small, inexpensive,  
automatic regulator:**

- Assures a **UNIFORM** safe lowering speed regardless of weight of load.
- Prevents sudden dropping of load due to inadvertent operation of control valve.
- Maintains a safe lowering speed of loaded forks in the event of hose or pipe failure.

**A must for  
lift-truck  
safety.**

*Write for illustrated booklet.*

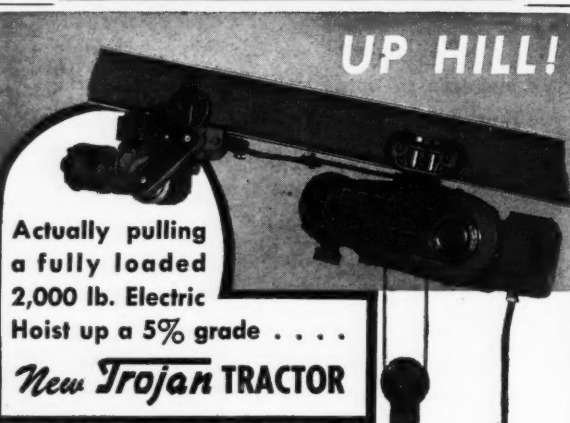
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**WATERMAN ENGINEERING**

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**UP HILL!**  
Actually pulling  
a fully loaded  
2,000 lb. Electric  
Hoist up a 5% grade . . . .

**New Trojan TRACTOR**

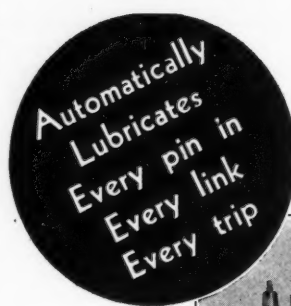
**The TROJAN TRACTOR can be  
applied to TRAVEL . . .**

1. Present hand travelled mono-rail hoists.
2. Existing hand travelled crane bridges.
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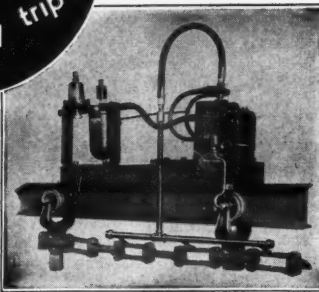
You probably have slow, hand propelled units which the Trojan Tractor can move by power,—faster and economically. Let us know what they are; we will give you the details.

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& MACHINE CO.**

8216 MORROW ST.  
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**The  
FAUVER  
Lubricator**



**KEEPS  
Conveyors  
MOVING**

Engineered to meet **YOUR** needs whether for slow, medium or high speed conveyors. Made for deep-freeze conditions — core oven temperatures to 1500°F.— or anywhere in between. Inexpensive, positive, automatic lubrication that keeps your production lines productive.

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**EASY MATERIALS HANDLING**

**BURRO** takes materials handling jobs like this in stride . . . does them with the same smooth speed and economy characteristic of this powerful, speedy locomotive crane, whether it's working with clamshell bucket, tongs, magnet, drag-line bucket or hook.

**BURRO's** heavy draw bar pull (7500 lbs.) and fast travel speeds (up to 22 MPH) make it an efficient switch engine too. You can spot cars *where* and *when* you want them, eliminating the "waiting time" which interrupts production and increases costs.

*Write for illustrated Bulletins.  
There is no obligation.*

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1320 South Kilbourn Avenue

Chicago, Illinois

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Yale & Towne Mfg. Co.	Fuller & Smith & Ross	4



All NATIONAL pallets are guaranteed for flawless construction. Each pallet made of moisture controlled hardwood at the source of lumber supply—and expertly assembled with hardened-steel drive screws. NATIONAL pallets will last longer under industry's toughest demands.

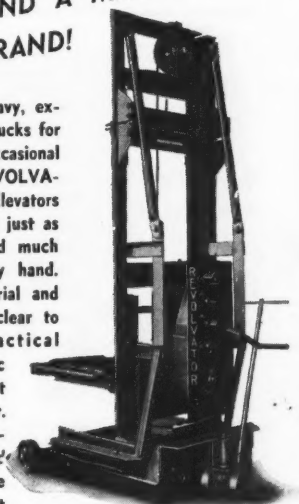
Write or wire for descriptive literature

**NATIONAL PALLET CORPORATION**  
MAIN OFFICES: OLIVER BLDG., PITTSBURGH 22, PA.

**REVOLVATOR**  
REG. U.S. PAT. OFF.  
**PORTABLE ELEVATORS**

**DON'T SEND A MAN ON A BOY'S ERRAND!**

No need for heavy, expensive power trucks for your light or occasional piling jobs. REVOLVATOR Portable Elevators will do the work just as efficiently and much faster than by hand. Safeguards material and operator. Piles clear to ceiling—any practical height. Electric drive models lift 5,000 lbs. or over. Tell us your requirements and let us quote you on the right model for YOU.



This Hand Power REVOLVATOR Lifts Up to 2,000 lbs. Revolvable Base Facilitates Tying in Close Quarters. Hinged Top Permits Tipping Machine Under Low Doorways. Price \$700 Up. Depending on Height of Lift.

**REVOLVATOR CO.**  
DESIGNERS AND MANUFACTURERS OF MATERIAL HANDLING EQUIPMENT  
8739 Tonnele Ave., North Bergen, N. J. - Since 1904



# Materials HANDLING EQUIPMENT

## Metal Bound SKIDS and PLATFORMS



Item S-519

### WOOD NESTING RINGS ON WOOD SKIDS OR PLATFORM

Corner stacking lugs of nesting rings lock into position on platform and also nestle on each other, rings obtainable in any dimensions, ideal for handling parts to be machined; add as many rings as size of load demands; lift rings off as contents are removed.

For quotation give dimensions of rings, type of skid construction, and quantity of each wanted.

## Quick Delivery

**One to Two Weeks**

**When Ordering** give item number to prevent error. All prices f.o.b. Detroit—subject to change without notice.



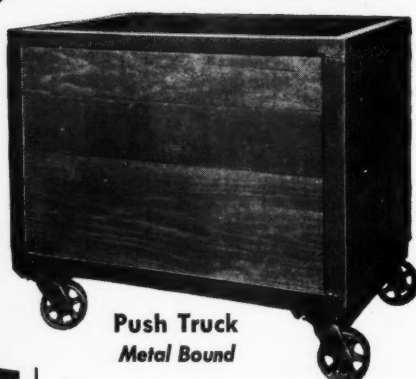
Inverted end angle.

One piece binding angle. Heavy angle welded legs.

Without end binding angle.

**Item S-784 Standard Platform**  
Hardwood, metal armored, built to customers' specifications.

## Metal Bound BOX TRUCKS



**Push Truck**  
**Metal Bound**

May be used as a push truck or with lift truck. Built of all hardwood, completely metal bound, all welded construction, no bolts used. Four sturdy, 5" swivel casters. Metal parts finished in air dry enamel, wood left natural.

### TWO STANDARD SIZES

**Item NS-418A \$3570**

Measures 24" wide, 36" long, 26" high overall. Weight 185 lbs.

**Item NS-418B \$4055**

Measures 28" wide, 48" long, 30" high overall. Weight 260 lbs.

### Wood Box Metal Bound



This box has four-way lift truck entrance (side or ends). When ordering be sure to give underneath clearance required for your lift truck.

### TWO STANDARD SIZES

**Item NS-249A** is 34" wide, 42" long, 20" deep overall box size. Add leg length for total height. Wt. 225 lbs.

**\$3260**

**Item NS-249B** is 34" wide, 48" long, 24" deep overall box size. Add leg length for total height. Wt. 300 lbs.

**\$3605**



**Wood Box**  
**Tilt Type, Metal Bound**

A general utility push truck, "Tilt-Type" for easy wheeling and short turning of corners. Two rigid and two swivel, 5" metal casters, 1/2" tilt.

### TWO STANDARD SIZES

**Item PS-91A** measures 24" wide, 36" long, 26" high overall, Weight 185 lbs.

**\$3570**

**Item PS-91B** measures 28" wide, 48" long, 30" high overall, weight 260 lbs.

**\$4055**

DESIGNED AND MANUFACTURED BY

# Palmer Shile Co.

16012 Fullerton Avenue, DETROIT 27, MICHIGAN

# BIG WAREHOUSE INSTALLS SEVEN G-E RECTIFIERS

*- improves efficiency of handling operations*

**Use of General Electric battery-charging equipment  
results in faster storage, keeps costs low**

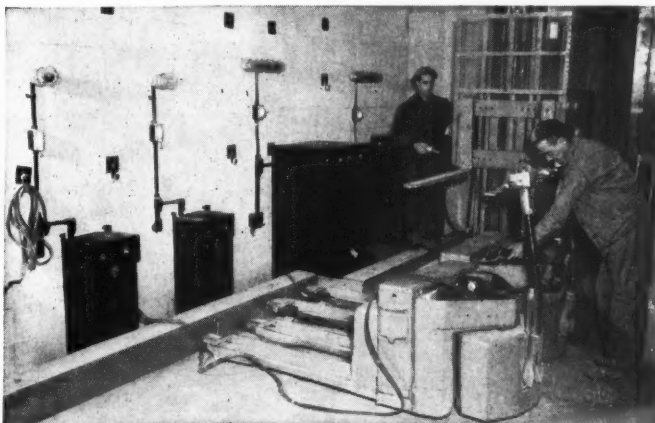
Carrying out a program of modernizing its materials-handling methods, the Fitz Warehouse Company, Boston, Massachusetts, converted to palletized loads and electric trucks. General Electric copper-oxide rectifiers were selected for the job of keeping truck batteries in top operating condition.

Now, with more than a half year of service as a yardstick, the operators of this busy warehouse are well pleased with the performance of the General Electric rectifiers. A. N. Greenquist, president, says, "These chargers have done a fine job of servicing seven busy trucks. They have proved economical to operate and, except for a few minor adjustments by a General Electric service man, they have required no maintenance. Equally important, our workmen like them, too."

Our files are full of similar records of satisfied users of General Electric truck-battery rectifiers. We'd like to tell you about them, and how G-E equipment can help you with your materials-handling problems. Why not discuss it with the truck agent in your locality who handles G-E chargers, or write for your copy of our comprehensive booklet, to Section A88-1036, General Electric Company, Bridgeport 2, Connecticut.



*General merchandise from all over the United States is handled at Fitz Warehouse. Goods, ranging from foodstuffs and furniture to drums of oil, heavy machinery, and cement, pass through the receiving shed shown here. Batteries of electric trucks that move these goods to seven adjoining floors of storage area are kept well charged by General Electric chargers.*

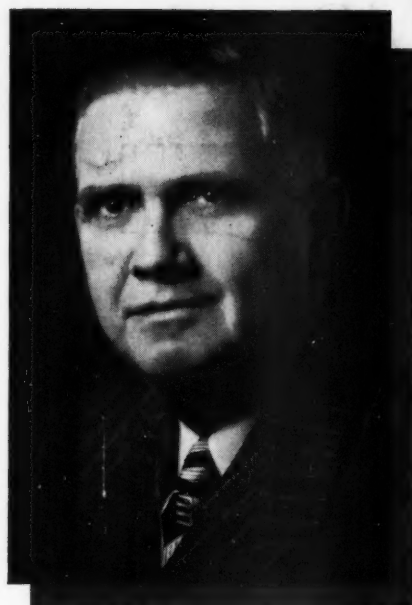


*This well-arranged battery-charging station serves 2 fork trucks and 5 booster trucks. Trucks, in operation 8 hours a day, are given a noon-hour charge, and are also brought in after work for a 3½ hours charge. The seven G-E copper-oxide rectifiers require little supervision, because they cut off automatically when the battery is completely charged.*

**GENERAL  ELECTRIC**

# A TOOL FOR PROFITABLE PRODUCTION

*Earl Bunting says:*



**EARL BUNTING**  
President, National Association  
of Manufacturers  
President, O'Sullivan Rubber Corporation,  
Winchester, Va.

The truth is still to be recognized by a large segment of management, in all fields, that more efficient operation of industrial plants is absolutely necessary in order to reduce the ultimate selling price of commodities in face of rising labor and material costs; and that efficient material handling is a direct means to this end.

Proper material handling is, in my opinion, one of the most potent tools management may wield for greater efficiency in production and a stronger competitive position.